APRIL 1956

plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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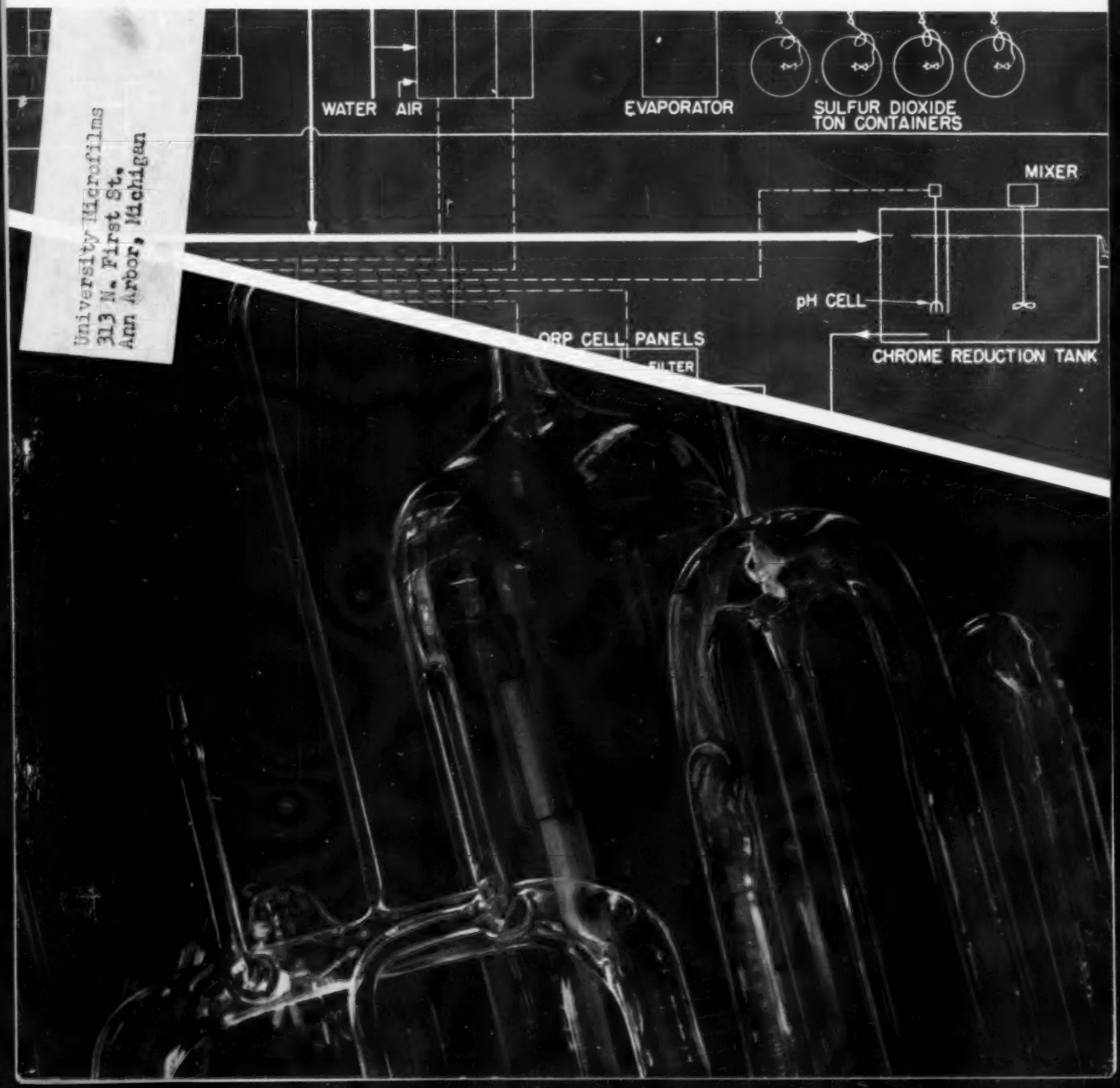

LIBRARY OF CLEPO SERVICE

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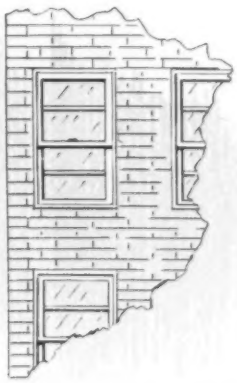
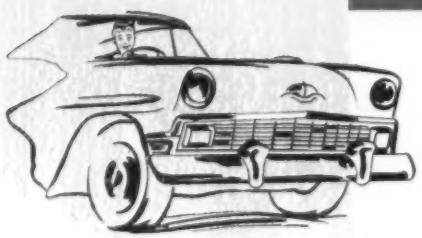
METAL FINISH INC.
CLEANERS AND PROCESSES



SAT-N-ETCH



...a treatment of interest to producers of aluminum articles

SAT-N-ETCH is actually a "finishing" process. Most other CLEPO products are formulations for cleaning, processing and protecting metal surfaces prior to or following certain production steps.

CLEPO SAT-N-ETCH produces a clean, silvery appearance on wrought or sheet aluminum. Many shops are now using this process to meet the sales department's demand.

This is a 2-step process, involving an etchant (CLEPO 30-R) in the first step. This formulation is fast and efficient and lasts a long time. It also eliminates maintenance problems due to scaling up of tank and coils. Step No. 2 involves the use of CLEPO 180-S which removes smut, develops the silvery appearance and passivates the surface. CLEPO 180-S is a free-flowing powder. It eliminates the hazards of acid treatment.

CLEPO offers not only this "finishing" process to those working with aluminum but also formulations for cleaning prior to anodizing and spot-welding, stripping of anodic film, deburring and burnishing and for other surface treating purposes. Our nearest Field Service man will be glad to discuss our entire service in connection with CLEPO Formulations for aluminum. He has back of him twenty-five years of service to your industry.

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Go from GRIME . . . to . . . SHINE . . . in SECONDS!

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DIP . . . . steel parts to be cleaned in Emulsion Cleaner 75 for only ***15 seconds.*** This simple immersion is done at room temperature (no heating facilities required) and with no irritation of the operator's nose, throat or skin.

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THE FINISHING TOUCH

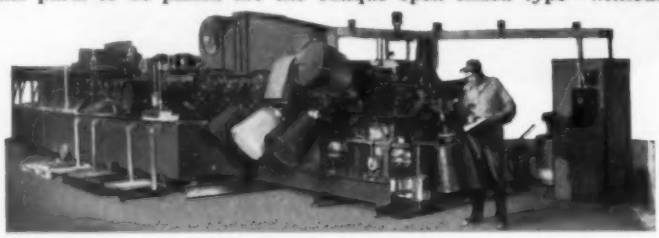
by Guy A. Cummings
Metal Finishing Sales Manager
FREDERIC B. STEVENS, INC.

How Modern Equipment Can Improve Your Operations

Judging from the vast number of quotations on automatic equipment for electroplating, anodizing and processing being made each month at Stevens, we know the interest in automatic equipment has never been higher. To meet competitive prices, improve finishes and lower labor costs, metal finishers are constantly challenged to make modern improvements in their operations. Usually this means more modern equipment.

Let us tell you how the Stevens Automatic Barrel Plating Machines can help you. They are used for zinc, cadmium, nickel, brass plating of such small parts as screws, bolts, nuts and stampings, and also a wide variety of bulk immersion processes such as phosphatizing, washing, pickling, and chromating.

We have been making these machines for a long long time—hundreds are in operation—so you can be confident that there are no mechanical bugs. They are simple to operate—feature automatic unloading—and when equipped with automatic load devices, several machines can be operated by only one man. The cylinders which take the parts to be plated are the oblique open ended type—without



covers. By raising or lowering the cylinder the parts slide in and out without the necessity of unclamping and removing covers normally needed for horizontal type cylinders.

The Stevens simple compact design makes it economically feasible to purchase production capacities as high as 4000 pounds per hour in one machine, or just as practical to distribute the capacity between two or more machines to provide flexibility in plating thickness, production, etc.

Here are other advantages in using Stevens Automatic Barrel Machines—uniformity of deposit, fewer rejects, better working conditions, easier chemical control, better scheduling and delivery and *lower costs per piece.*

The selection of the right equipment, the capital investment required, the arrangement of your plant to install the equipment are important considerations. Frederic B. Stevens, Inc., with its long experience in the metal finishing field has made many analyses of this kind. We can help you too.

Write to Frederic B. Stevens, Inc., 1808 18th Street, Detroit 16, Michigan.

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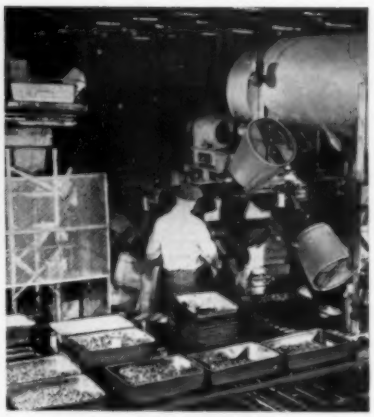
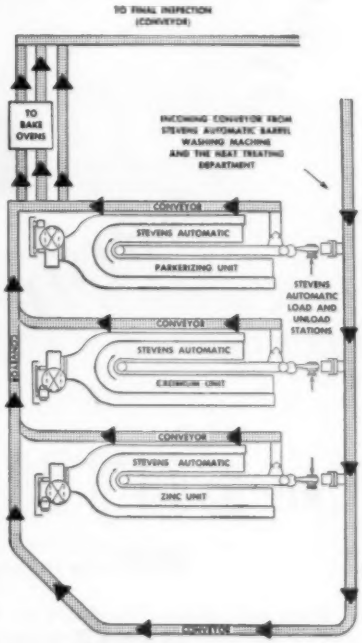


Showing Automatic Loading Device and Automatic Barrel Unloading Station on Stevens Automatic Barrel Processing Machine, incorporated as part of the Straight-Flow operation.



Millions of small stamped fastening devices, pre-assembled screws and nuts, and twisted-tooth lockwashers are automatically washed, parkerized, zinc and cadmium plated in Stevens Automatic Barrel Processing Equipment annually at this modern plant. Cleaner operation, fewer rejects and better control of plating thickness are some of the advantages being realized by the operators.

An Educational Society for the Advancement of the Science of Electroplating, the Finishing of Metals and Allied Arts

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APRIL 1956

plating

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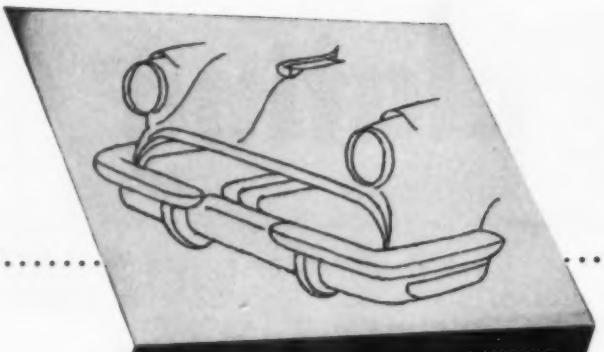
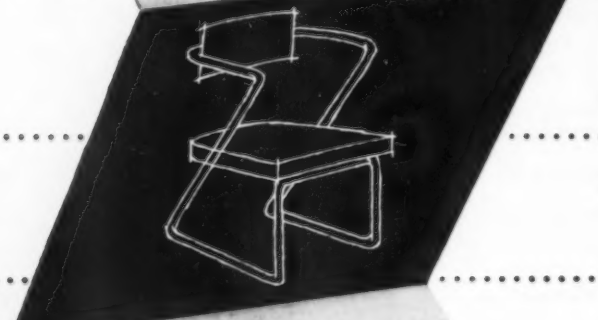
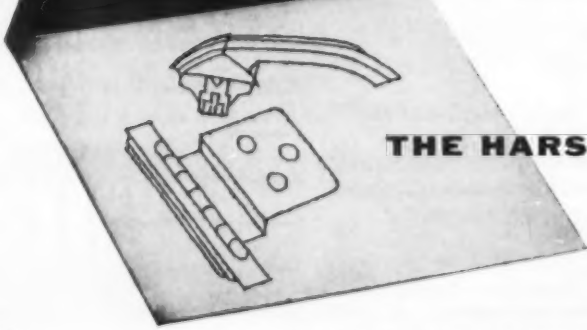


HARSHAW electroplating CHEMICALS and ANODES





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cadmium plating

. . . ball and cast cadmium anodes . . . cadmium oxide . . . sodium cyanide . . . cadmium fluoborate.

tin plating

. . . cast tin anodes . . . sodium stannate . . . stannous sulfate . . . tin fluoborate . . . acid tin addition agent.

zinc plating

. . . ball and cast zinc anodes . . . sodium and zinc cyanide . . . zinc sulfate . . . zinc fluoborate.

lead plating

. . . cast lead anodes . . . lead fluoborate.

silver plating

. . . silver cyanide.

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EDITORIAL

CONVENTION MEANS A COMING TOGETHER

The habit of getting together has been with men since before the days of the Romans. They were the first to define it specifically and to give special meaning to the word "Convention," from the Latin, "Convenire."

Today, we seem to become stuffy in our acceptance of words. We use them loosely and lose their full meaning. We talk, for example, of conventions—and see a thousand kaleidoscopic scenes which imply everything from hotel lobbies to convivial drinking.

In this issue is included a tentative list of papers which will be presented at the AES Convention in Washington, D. C. on June 17–21. A mere glance at the list will serve to define the quality of the getting together which can be anticipated.

There will be brilliant men telling of their accomplishments. Subjects, heretofore considered strictly laboratory curiosities, will be explained on a practical level. New developments in well-developed fields will be reported.

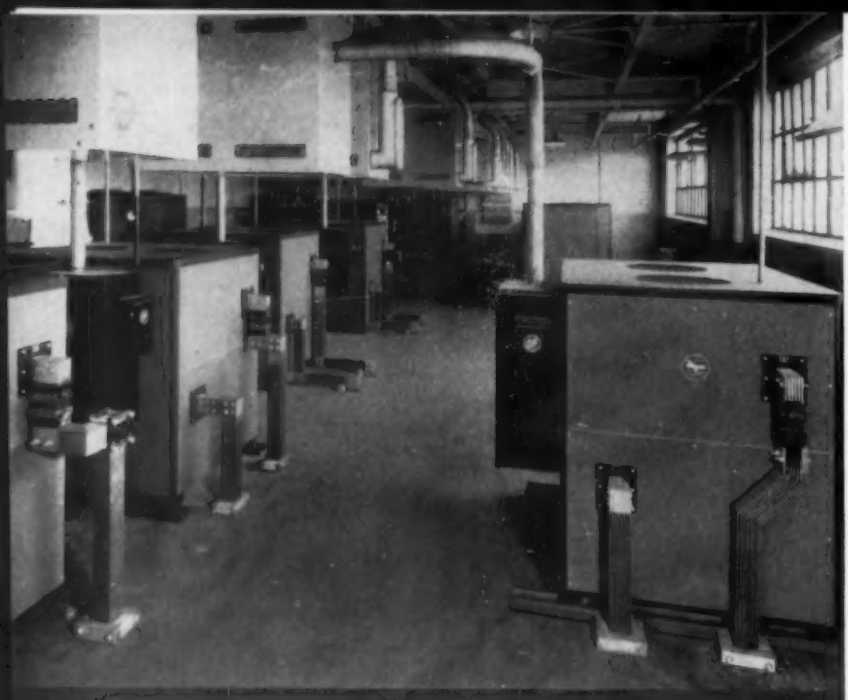
It is to the advantage of everyone who wants to be progressive in his field to come together with his fellows in Washington. There they shall learn even as they teach. There they shall exchange notes and discuss common problems with others who share their interests.

In addition, there are many attractions for the rest of the family in what is probably one of the most attractive cities in the world. Here is your opportunity to see one of the most unique cities in the world—in most recent years often called the "capital of the world."

The Washington Convention is a "capital idea."

Venite!

THE EDITOR



PRODUCTION PLATING WITH UDYLITE-SELENIUM

75,000 amperes of Rectification with push-button control

In this ultra-modern automatic plating operation the rectifiers selected were Udylite Selenium—with a total output of 75,000 amperes.

30,000 amperes at 2 to 9 volts are used alone for the nickel plating operation. These selenium rectifiers are controlled automatically by a single push button control. No matter how much work is in or out of the tank, the amount of voltage is automatically adjusted to remain constant.

The chromium plating is equipped with 9 volt selenium rectifiers. Each rack of work goes into the chrome plate "live" at approximately 3 volts. When the racks arrive at the bottom of the down stroke a strike voltage of 9 to 18 volts is applied for a few seconds—then the voltage is lowered to regular plating voltage —and it's all done automatically!

Udylite has engineered hundreds of similar installations of all sizes for all kinds of metal finishing operations. Why not call on this experience for your rectifier problems—either Selenium or Germanium? Write us today.

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WORLD'S LARGEST PLATING SUPPLIER

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UDYLITE OVERSEAS

Gothenburg, Sweden

In Sweden nickel plating is the predominant electroplating process, and bright nickel plating is used as much as possible.

Bright Nickel plating was introduced into Sweden in the thirties when the first so-called bright nickel plating solutions were imported from Germany.

During the second world war the supply of nickel for decorative nickel plating purposes was practically nil, and very little nickel plating was carried out. Research on bright nickel plating was, however, being done and it was possible to formulate one or two bright nickel processes.

When the war was over, and nickel became available again, it was quite clear that organic bright nickel was the answer to many nickel plating problems.

The conditions for the successful exploitation of the Udylite processes were thus given, and it was also possible to get the main share of the bright nickel plating business in Sweden.

Blasberg, Germany

During the few months since the introduction of Zero-Mist into Germany we can definitely state that daily, there is increasing interest in this aid to the plating trade.

From practical experience we can confirm that the saving of chromic acid, resulting from elimination of losses from extraction and dragout, adds up to 70% and in many cases even more.

Helsingfors, Finland

The light metal industry making consumable goods which require high class surface treatment has only during the last few years become more common in Finland, this depending mainly upon the fact that the export of this kind of article has been difficult lately, due to currency difficulties.

Plating plants, especially those carrying out jobbing plating, were competitive and are still competitive in price.

The high salaries and overheads and the fact that a mechanized sequence reduces the reject percentage have made it clear to our customers lately that an automatic plating plant is the working method to which we have to strive.

Nowadays about 50% of the nickel plating baths in our country are Udylite bright nickel baths.

Bienne, Switzerland

Brycad Cadmium: Practical trials on a large scale at one of our more important machine factories have shown that the physical characteristics obtained, whether from the passivated deposit or not, were better than in other deposits obtained in Switzerland. It even seems that the chemical resistance is slightly superior to that of deposits of cadmium from normal baths.

INDICATE A 404.

(Advertisement)

UDYLITE OVERSEAS

Brussels, Belgium

We have already made a start in Belgium with conversions of Udylite No. 31 bright nickel baths to 514. Reactions have been favourable with regard to brightness, better coverage and a whiter nickel deposit.

We have also launched the new Brycad Cadmium in Holland and in Belgium. It does seem that the improvement of Brycad is appreciable in comparison with the old process. One of the undoubted advantages is the fact that the brightness is sufficient for commercial use and that after-treatment can be carried out in more dilute solutions with the result that the minimum of the metal deposited is removed.

Copenhagen, Denmark

In Denmark trials were recently made with bright nickel plating in conjunction with abrasive belt polishing at the largest vacuum cleaner factory in this country.

The parts to be plated were steel tubes, which are shaped for various applications. The method hitherto used by the factory has been handpolishing followed by dull nickel plating and a finishing operation on the nickel deposit.

The treatment suggested by us was as follows: Centreless wet polishing with abrasive belts, forming operations, followed by direct bright nickel plating without any intermediate hand-polishing or finishing.

Though the brightness of the nickel deposit with the Udylite 31 bath was considered to be fairly good, an appreciable removal of the grit marks proved to be impossible with the deposit of 9 microns.

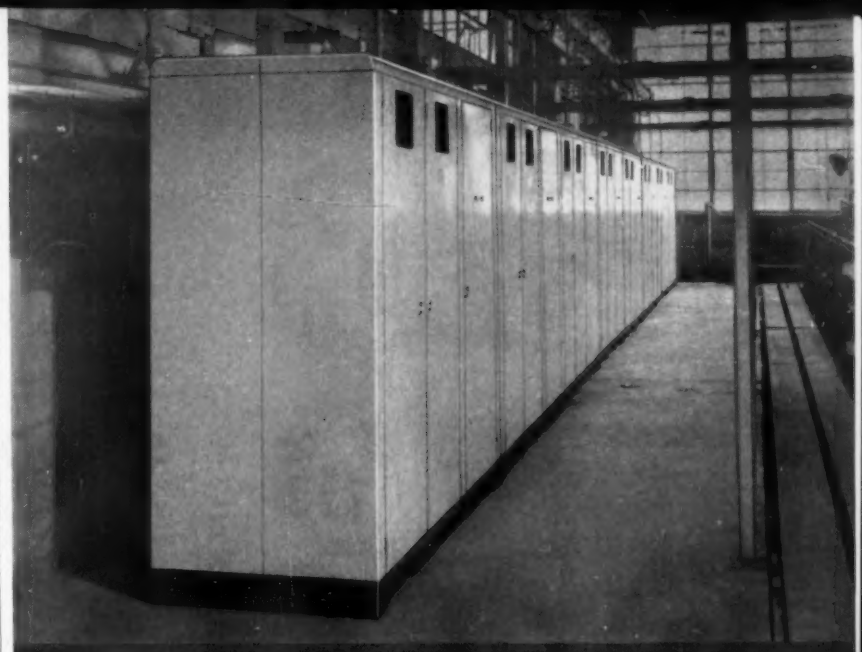
A few centreless polished and formed parts were nickel plated by the new No. 514 process. The finish of these samples showed a surprising improvement compared with the first tubes, both as regards brightness and also line removal.

The customer in question is satisfied with the results and is to start nickel plating his tubes by the 514 process.

Barcelona, Spain

Sociedad Espanola de Automoviles de Turismo, S. A., which is producing in Spain under F.I.A.T. license the well known 1,400 automobile, has recently introduced into its equipment the largest bright nickel installation existing in this country. During the last two years this firm has been using two bright nickel units for small parts bulk plating and a set of barrels for Udylite Bright Nickel plating.

In view of the results obtained with the two bright units, the Company decided to substitute their Watt nickel baths, each one of a 6,000 litre capacity, by the Udylite bright nickel bath in spite of the big investment implied in the modification.



UDYLITE PROVES GERMANIUM EFFICIENCY FOR ELECTROPLATING

48,000 amperes at 12 volts used for nickel plating

The eight liquid cooled germanium rectifiers installed by Udylite and used by the Hilfinger-Jackson Corporation provide the 48,000 amperes at 12 volts required for nickel plating in the Udylite Full Automatic Plating Machine.

This first operation of liquid cooled germanium rectifiers for electroplating was carefully studied for proof of economy. The calculated efficiency and the resultant savings were weighed against the cost of the installation. The unmatched efficiency, the unvarying life of the cells, and, with these liquid cooled units, the elimination of the ventilation requirement, swung this decision to germanium.

Udylite furnishes air cooled germanium rectifiers. Air cooled units range from 1000 to 6000 amperes—6-24 volts. Liquid cooled units—4000 amperes or more and up to 24 volts.

Udylite also builds selenium rectifiers of highest efficiency. Whatever your power requirements may be, it pays you well to investigate the Udylite Selenium and Germanium Rectifiers.

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DETROIT 11, MICHIGAN

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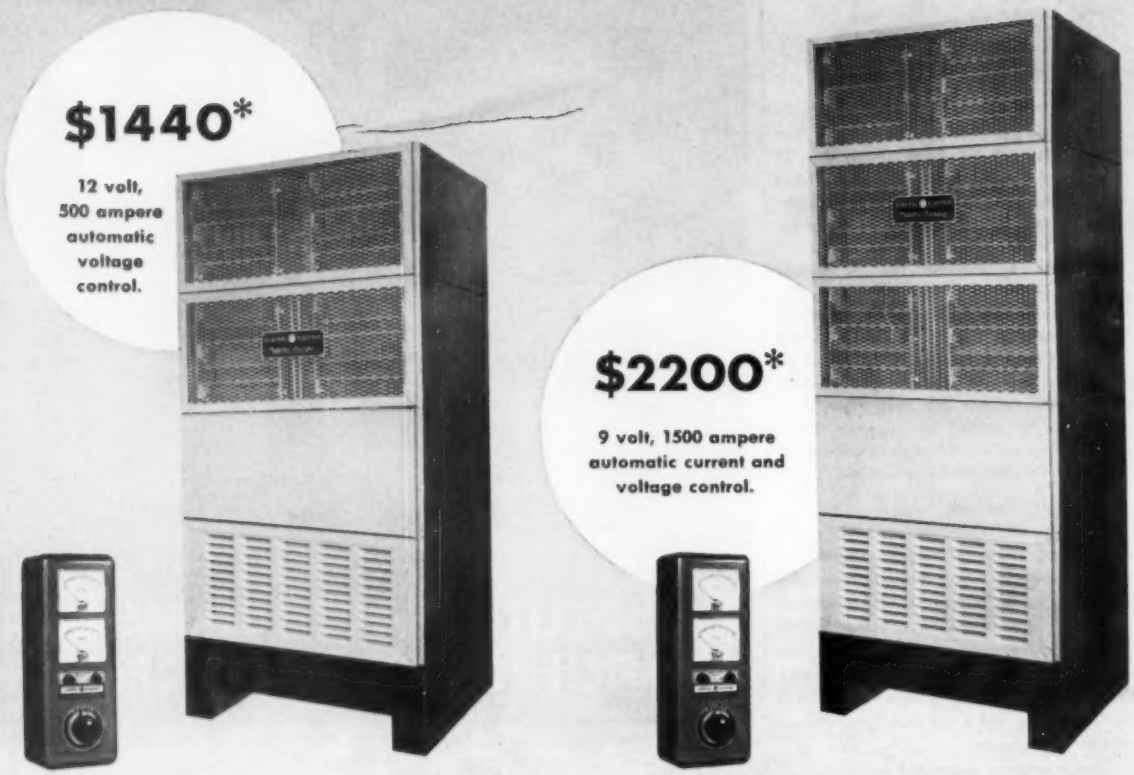

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TRIM ALLOYS, INC., OF BOSTON SHOWS HOW G-E AUTOMATIC POWER SUPPLIES SAVE LABOR, SPOILAGE, AND MAINTENANCE.

Lower prices on General Electric automatic plating rectifiers now let you take a big step toward complete automation . . . at low cost.

Besides bringing within your reach the savings of automation, G-E automatic plating power supplies are designed to assure you of uniform plating.

The Trim Alloys, Inc., installation was engineered by The Chemical Corp., Springfield, Mass.

HERE IS THE REPORT OF TRIM ALLOYS, INC., which uses G-E automatic plating power supplies for anodizing aluminum extrusions: "Ours is a high quality process, yet we don't want to waste time, manpower, or materials. In order to maintain our high standards with manual control, we would need a man on the controls all the time. With G-E automatic control, however, we free our operators for other work . . . and get much better control, too. We simply push the start button and the unit seeks its own best setting for that particular load, shutting itself off at precisely the same interval each cycle."

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* *Manufacturer's suggested user price.*

Plating Rectifiers Every Plating Shop

AN INCREASING NUMBER OF PLATING SHOPS are discovering that G-E plating power supplies with automatic control cut plating costs in three big areas:

1) LABOR—No one needs to stand by the controls to adjust for changes in the tank load. Plating operators can be freed for other operations.

2) SPOILAGE—Spoilage is reduced, since deposition is kept uniform by the constant current or voltage. This reduction in spoilage means fewer rejects . . . less re-working expense.

3) MAINTENANCE—Maintenance is kept low, because both the G-E automatic control and rectifier are mechanically static. Except for the cooling fan, there are no moving parts.

BEFORE YOU BUY ANY PLATING RECTIFIER, check G.E. for the three types of automatic regulation available: (1) voltage, (2) current, and (3) anodizing.

For full details, contact your G-E plating agent, or send in the coupon.

UNIFORMLY ANODIZED EXTRUSIONS are removed from the tank at Trim Alloys, Inc. Automatic control assures uniform, high-quality anodizing every time, resulting in fewer rejects.

THE DESIRED ANODIZING SEQUENCE is set up by the operator at the rectifier control panel. Once set, the anodizing sequence is completely automatic, requiring no further adjustment.

THE REMOTE-CONTROL STATION is conveniently located within easy reach of the operator right at the anodizing tank.

Section F463-13, General Electric Co., Schenectady 5, N. Y.

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COVER STORY

SCIENCE SETS THE SIGHTS

The appeal of science is universal. Everywhere men seek its advantages; they seem challenged to explore, to want to understand, to know how things hang together. This universality of science causes it to transcend limitations of national boundaries, creeds, color, prejudices and politics. It is a discipline which makes giants of men and paves the way for the progress of all, be they scientists or laymen.

On our cover this month are depicted some of the symbols of science which are germane to metal finishing. Those glass receptacles might just as easily contain chemical reagents, foods, medicines, special gasses, plating compounds, or electronic elements. The background, of a blueprint of a plant layout, implies the use to which some of the science of the laboratories is put.*

Yet, science generally cannot flourish nor even long continue to exist if its freedom and integrity are not safe-guarded. Hence, science finds its greatest expression in organizations like the AES. Here, opportunity of intercommunication among scientists all over the world is afforded through meetings, conventions, courses, PLATING magazine, research reports, etc. Here commingle all the men of science from the lab-locked theoretician and experimentalist to the working practitioner who works "over a tank."

In organizations like the AES, suppliers can speak to businessmen and workers and convey to them the secrets of the uses of the materials and equipment they offer. Scientists can teach and be taught as they share problems with workers, suppliers and businessmen. Here, new discoveries, new ideas and new goals and their applications are introduced, tried, tested and practiced.

In our continuing struggle for the freedom of communication between men of good faith, we are engaged in a noble effort. We struggle to realize the highest aspirations of mankind and for mutual understanding and progress between men and nations. It is a noble cause. Our cover can but faintly suggest the penetrating meaning of the field in which we work and the lasting good which is wrought by men of good will.

The Editor

* *The Lasky Co. of Newark, N. J. arranged with its client, Thomas A. Edison, Inc. for our use of the four-colored plates owned by the latter. We thank both companies for their courtesy.*

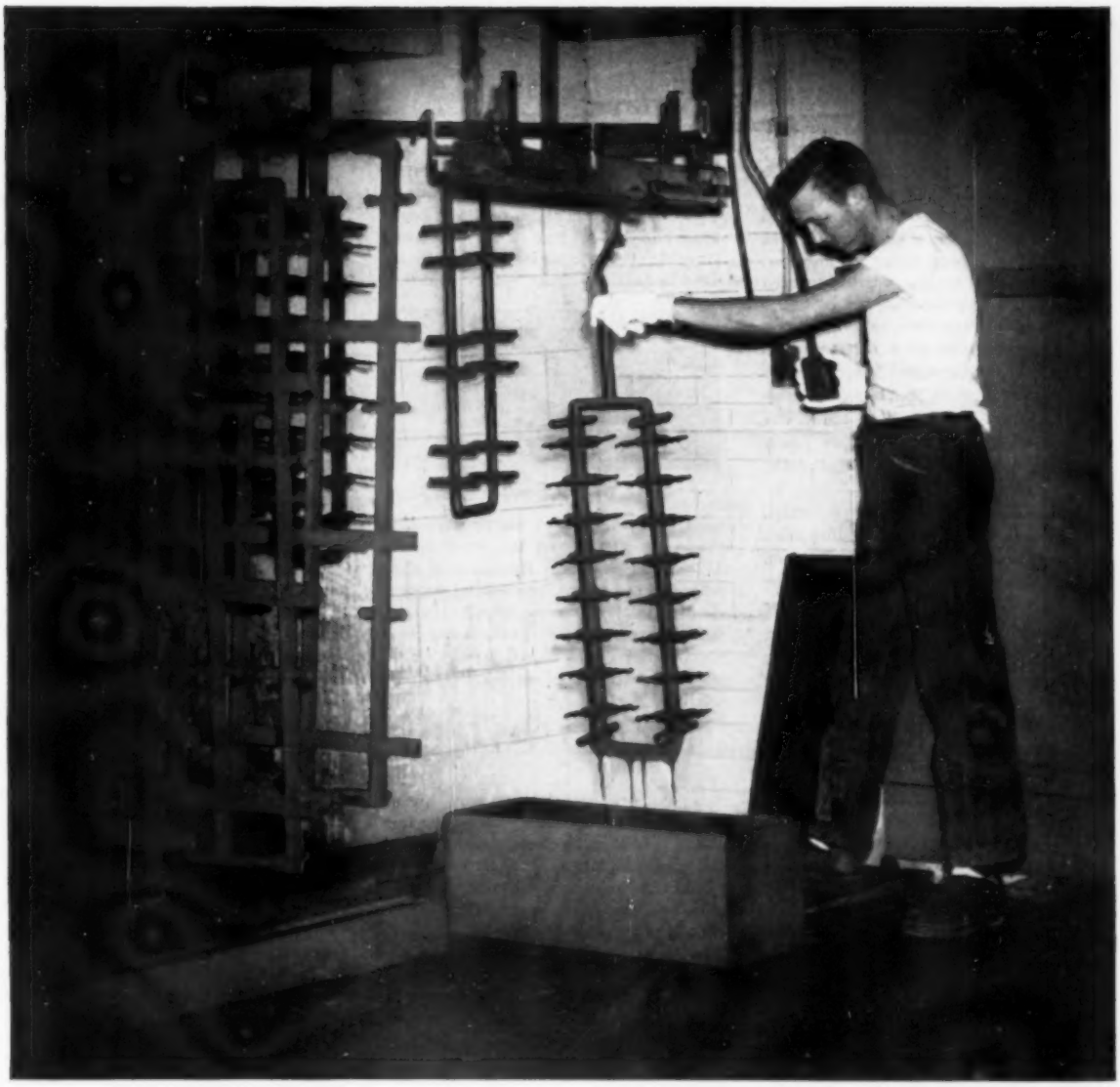

Photo courtesy F. D. Pace Co., Grand Rapids, Mich.

What coating's on top?

Unichrome Coating 218X, of course!

EXCEPTIONAL service life makes Unichrome Coating 218X the preferred rack coating in an impressive number of plants. Applied on top of unequaled Unichrome Primer 219PX, this flexible, vinyl plastisol coating withstands all plating and cleaning cycles . . . doesn't chip, crack, blister . . . rinses freely. It won't contaminate solutions . . . is approved for use in leading bright nickels. Saving time and maintenance, users find it costs least in the end.

If you don't want to apply Coating 218X yourself, nearby qualified specialists can do it for you. Ask us for names.

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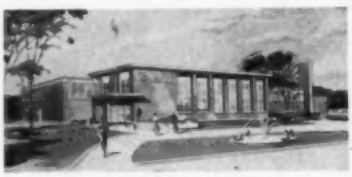
INDUSTRY NEWS

New Ultra Modern Plant—Precise Products Corporation has announced plans to move into a new, ultra modern plant on Blue River Road, Racine, Wis. Designed by famous industrial engineer, A. Epstein & Sons, and set in a wooded area near Pierce Woods, the new plant has over 15,000 square feet of floor space. According to executive vice-president Helmut W. Schumann, the expanded facilities will permit a 100 per cent production increase on their widely known line of high-speed, portable electric power quills, grinder millers, machine tools, rotary tools, and accessories.

A pleasant example of modern industrial architecture, the plant is a one story brick building, with executive offices located on a mezzanine floor that overlooks both the business offices and plant. Provisions for air conditioning have been made to serve both the plant and the general offices.

Precise has a tradition of precision manufacturing which goes back to 1882, when the company was founded as Firm A. Schumann in Duesseldorf, Germany. This company was seized by the Nazis in 1939, but by 1941, the founder's son and grandson, Robert and Helmut Schumann, were in business again. With $3,000 in



Modern Precise

borrowed capital, they set up shop in a Racine garage, moved ten years ago to 1328 Clark Street in Racine, and now, with the new plant, are adding another chapter to their success story. German facilities were returned to the Schumanns shortly after World War II, by the AMG, and are now operated as Precise GMBH, in Duesseldorf.

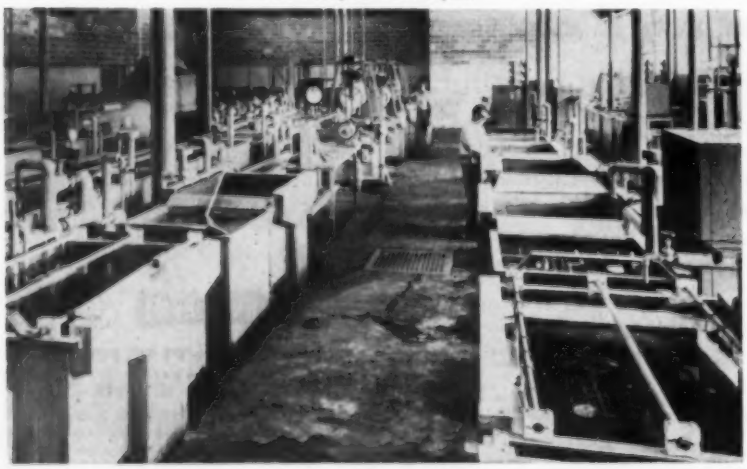
What the Well-Planned Plating Room Looks Like—Orderly arrangement of plating equipment enables Westinghouse Electric Co. to process thousands of electronic parts daily in any of 16 different ways at its Air Arm plant in Baltimore.

Westinghouse coordinated equipment layout and operating procedures for this plating room with engineers from Hanson-Van Winkle-Munning Co., Matawan, N. J., who specified and supplied processing equipment.

First three tanks in photo are for electrocleaning cold rinsing and pickling. Tin, cadmium and zinc plating barrels are at the end of this processing line. The line on the right handles electrocleaning nickel and chrome plating. All tanks in this room are arranged so that metal parts are routed as quickly as possible through the various processes.

Air Arm cleans, anodizes and plates hundreds of different metal parts in this shop. These parts—which include small flat work, chassis, screws, nuts and fixtures—are used in the manufacture of search-and-track radar and other electronic equipment.

Assembly Line Principles



Acheson Builds Plant in Holland—Plans to construct the first colloidal graphite manufacturing plant in the Netherlands have been announced by Acheson Industries, Inc., New York, N. Y. Construction and operation of the factory, located near the harbor of Eexta, Borough of Scheemda, will be supervised by Acheson Colloids Limited, the firm's British affiliate. Estimated cost of construction is over 470,000 Dutch guilders, approximately $135,000.

Dutch Modern

Post-war expansion of Dutch industry, particularly in the electronic, metal-working, and foundry fields, has created a substantial market for colloidal dispersions which are commonly used for general and extreme temperature lubrication, mold coating and parting and forging compounds, impregnation, opaquing and television tube and other electronic applications.

The Scheemda production unit will have sufficient capacity to satisfy all requirements of the Continental market as well as the Dutch. According to Acheson officials, prompt delivery and service will be afforded European industry as a result of by-passing Channel shipping delays.

To Double Capacity—Plans to double the size and facilities of Circo Equipment Company's Rahway, N. J. plant, at an anticipated cost of $100,000, have been announced by Melville Morris, the firm's president. He further explained that plant expansion was the direct result of greatly extended use of metal washing and solvent degreasing equipment by the manufacturing industries.

The expanded plant—at 51 Terminal Avenue—will have 14,000 square feet of general production area and 2500 square feet of engineering space added to the existing 24,000 square feet. It will be of reinforced steel, masonry and matching brick with sturdy supportive members and concrete flooring to withstand the weight and operating stress of overhead cranes and heavy production machinery. Offices will be air conditioned and the entire plant serviced by a modern ventilating and heating system.

Scheduled for completion in June 1956, the plant will be provided with additional new machinery to streamline and speed fabrication and assembly. Architectural design and supervision is under S. Lawrence Klein, Newark, N. J., and the general contract has been awarded to Villa Contracting Company, Westfield, N. J.

INDUSTRY NEWS BRIEFS

● Announcement of a unique stock-service agreement which will permit large stocks of Cooper Alloy stainless steel valves and fittings to be maintained at the Atlanta warehouses of **Reading, Pratt & Cady** was made by Cooper Alloy sales manager, Jack Victorine.

● New levels of efficiency and accuracy in routine stainless steel analysis with spectrochemical instruments were reported to the **Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy.**

● Construction has commenced on a new 15,000 square foot warehouse for the **Molded Products Division** of **Stauffer Chemical Company** in Vernon (Los Angeles) Calif.

● The nonpower industrial applications of nuclear energy will be explored at a conference at the **Museum of Science and Industry** in Chicago on May 15 and 16.

● The **Colorado Fuel and Iron Corporation** has moved its Chicago district sales office and warehouse to larger quarters at 3838 West 51 St. Chicago 32, Ill.

● **General Ceramics Corporation** of Keasbey, N. J. has appointed the **Kem-E-Quip Corporation** of Niagara Falls, N. Y. sales agent for their chemical stoneware and porcelain equipment.

● One of the nation's oldest and largest manufacturers of refractory products, the **Robinson Clay Product Co.** of Akron, Ohio is observing its 100th Anniversary in 1956.

● Seventeen industries making use of atomic energy, together with public safety groups and government agencies have begun work on national standards for the commercial and industrial use of fissionable material.

● It is now more important than ever to remove tax obstructions to capital investment, the **National Association of Manufacturers** declare in a report analyzing recent statements made to the Joint Committee on the Economic Report which minimized the effects of taxation on the availability of capital.

● The Military Sea Transportation Service's prototype "Roll-on/Roll-off" ship, USNS T-AK 269, will use two turbine-generator sets to be built by **General Electric Company's** Small Turbine and Supercharger Department.

● Production and sales of chemicals and explosives in 1955 were the highest on record for **Atlas Powder Company.**

● Shareholders of **Rheem Manufacturing Company** and **Richmond Radiator Company** voted overwhelmingly to merge.

● **Nitrogen Division, Allied Chemical & Dye Corporation,** announces that it will install at its Hopewell, Va., plant facilities for the production of solid ammonium nitrate 33½ per cent N. The new facilities are expected to be in operation about the end of 1956.

Barrel Nickel Plating Contamination

●

The contamination which causes trouble in barrel nickel plating is usually metallic in nature. Removal is by dummy plating at about ¾ volt until the contamination is removed. This may require from a few hours to several days.

●

The source of the contamination is a matter for concern, as much trouble can be avoided by eliminating the source. Work which is dropped into the tank almost invariably acts as an intermediate electrode and if made of brass or copper will dissolve and cause contamination. Iron tends to precipitate at the *p*H of barrel nickel solutions and causes sludge but normally does not interfere with plating.

●

The additions of nickel salts and chloride are a potential source of contamination. Single nickel salts (nickel sulfate) are usually pure enough to add considerable quantities without trouble. These salts from some sources have been known to contain copper so care should be used on salts from any new source or of unknown purity. Nickel chloride almost invariably contains sufficient impurities to cause trouble if added in large amounts. Large additions should be followed by dummy plating or additions should be made in small quantities over a week or more to allow time for impurities to work out. The use of magnesium chloride for a source of chloride is recommended as this material is available free of harmful metal impurities.

●

Anodes are a potential source of contamination. Three types of anodes are generally available. The rolled depolarized type are the recommended type for barrel nickel plating. Since they can be made only by heavy equipment not generally available their purity can usually be accepted without doubt. Rolled carbon anodes corrode best at *p*H values below 4.5. In barrel nickel solution they corrode but not smoothly. Because they are generally made the same way as the rolled depolarized this type can also be assumed to be pure.

●

Cast carbon anodes may contain impurities. All recast anodes are of this type and with present shortages are often all that is available. Since even 0.1% copper will cause much trouble anodes of this type should be suspect when consistent recurrence of contamination exists without other cause.

●

Poor anode corrosion is always accompanied by a lowering of *p*H so that a solution which maintains its *p*H or even requires occasional acid additions to keep in range may be assumed to have good anode corrosion regardless of how few the anodes are.

TRUE BRITE CHEMICAL PRODUCTS CO.
92 FALLS AVE. OAKVILLE, CONN.

INDUSTRY NEWS

Sylvania Sales and Income Reach New High—Sylvania Electric Products, Inc. has reported that its net sales and net income for 1955 were the highest in the 54-year history of the company. The company reported that second-half and fourth-quarter sales also set new records.

In exceeding a $300 million sales total for the first time in company history, Sylvania reported sales of $307,371,315 in 1955, an increase of 9 per cent over the $281,641,987 reported for 1954.

Don G. Mitchell, board chairman and president, said in a letter to share owners preceding issuance of the full annual report that net income last year totaled $13,812,970, exceeding the 1954 earnings of $9,480,941 by 46 per cent.

Elwell-Parker to Exhibit First Industrial Truck Ever Manufactured—The first powered industrial truck ever manufactured will be displayed by The Elwell-Parker Electric Company in Booths 1020 and 1024 at the 1956 Materials Handling Exposition to be held in Cleveland's Public Auditorium June 5th through 8th.

The truck, which is now on permanent display at the Ford Museum in Dearborn, Mich., was produced by Elwell-Parker in 1906 for the Pennsylvania Railroad. Elwell-Parker, which this year celebrates its 50th anniversary of industrial truck production, will return the truck to Ford at the completion of the Exposition.

In sharp contrast to the earliest truck model, Elwell-Parker will keynote its exhibit with a complete display of various attachments for handling loads without the use of pallets or skids. More than a dozen trucks will be on exhibit, including

The First

five new models which will be introduced for the first time. A large demonstration area will be provided for actual operation of the trucks under simulated plant conditions.

Tamms Plant Has Fire—On January 29 a fire of undetermined origin temporarily disrupted silica operations at the Tamms, Illinois plant of Tamms Industries, Inc. of Chicago.

The mill supply building and machine shop were hardest hit and one grinding unit was seriously damaged. In materials, the worst loss was in empty bags and some floor stocks of processed silica for drop shipments.

Repair work was started immediately and management expected all affected units would be operating at full capacity again by March.

Haveg Expands Into Polyester Fabrication—Dr. John H. Lux, president of Haveg Industries, Inc., announces the acquisition of facilities at West Warren, Mass. for the manufacture of polyester fiber glass equipment for chemical and corrosion resistant services. This represents a diversification and expansion for Haveg. Haveg has had many years experience in the fabrication of phenolic and furan resins.

Polyester fabrication operations in West Warren, Mass. will be conducted by the Pla-Tank Division of Haveg which will manufacture reinforced plastic equipment and tanks for applications where corrosion resistance and weight savings are a factor.

The Chemical Corporation, E. T. Manley, president, has been appointed a distributor for Haveg in the New England and Eastern New York State areas.

Technical Reps.—Chemical Development Corporation, Danvers, Mass., manufacturers of Devcon—The Plastic Steel (80 per cent steel 20 per cent plastic) announce the appointment of the following technical representatives: R. W. King Co., Meriden, Conn., for the New England states; B.S. Meade Co., Springfield, N.J., for metropolitan New York City and northern N. J.; and Charles Lawrence, Decatur, Ga., for Va., N. C., S. C., Tenn., Ga., Fla., and Miss.

Users of Hammond Junior Automatics report 3 to 7 times faster finishing than hand methods. The Operator merely loads and unloads the machine, result . . . . faster, better and more uniform finishing, more pieces per hour with less operator fatigue.

SEND SAMPLES: Send us one finished and several rough samples. You will receive a complete Engineering Report and Production Analysis without obligation.

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Good Machinery Since '82

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GUERIN TODD, SR.

Guerin Todd, Sr., of Hanson-Van Winkle-Munning Company, a widely known engineer in the electroplating equipment field, died on January 23 of a heart attack suffered at his desk. He was 60 years old.

Todd was vice-chairman of the board of directors of H-VW-M. His grandfather was Abraham Van Winkle, one of the founders of The Hanson & Van Winkle Company.

Heading the engineering activities of H-VW-M, Todd had worked for over 40 years in the electroplating industry. He was known personally throughout the field, and for the many contributions he had made to the development of full automatic electroplating conveyors. He holds several patents on conveyor equipment.

A native of Short Hills, N. J., for many years, Todd was graduated from Stevens Institute of Technology in 1916. In World War I, he was an aviator with the American forces in France. He was seriously injured when his plane was shot down several months before the war ended.

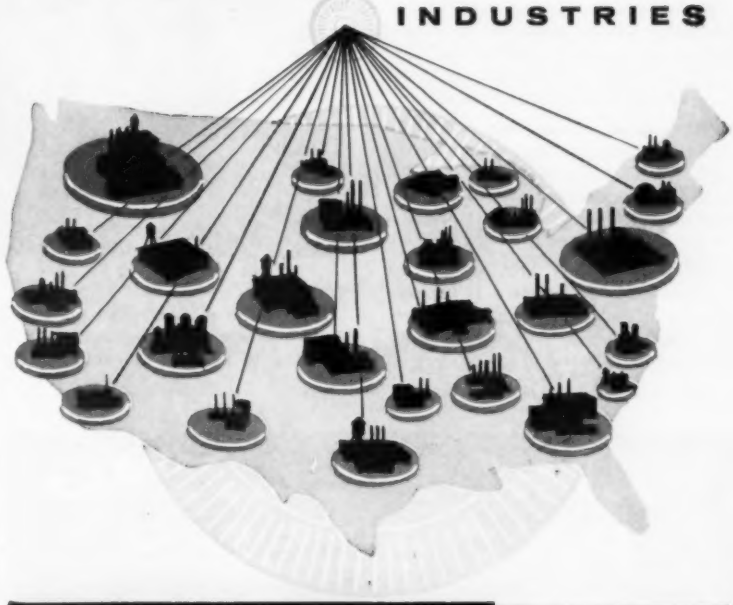
First employed with The Hanson & Van Winkle Company of Newark, he became chief engineer of Hanson-Van Winkle-Munning Company in September, 1927, when The Hanson & Van Winkle Company merged with the A. P. Munning & Company, of Matawan. He also became a member of its board of directors at the time. In 1939, he was elected Vice-President, and in 1948 became Vice-Chairman of the board of H-VW-M.

ALBERT WALTER

Albert Walter died January 28, 1956 at his home in Miami, Florida. When he retired in 1946 as chairman of the board of Stauffer Chemical Company, he had served the firm for 40 years. He commenced his career with Stauffer in 1906 as a mining engineer in charge of Stauffer's phosphate operations at Cokeville, Wyoming. He subsequently became eastern division manager in 1912, general manager in 1934, president in 1942 and chairman in 1945. For many years he had resided in Ardsley, N.Y. and following his retirement made his home in Miami, Florida.

Choice of the Nations

BLUE CHIP INDUSTRIES



MEAKER ENGINEERED PLATING EQUIPMENT

Meaker equipment is used for efficient and economical plating by many of the nation's most important builders of such products as automobiles, appliances, machinery, furniture and many others. When they install Meaker engineered equipment they are assured that it is designed to meet specific requirements. They are also certain that Meaker will stand behind the equipment during its whole operational life, making sure that it produces the best possible plating job at reasonable unit costs.

Meaker has accomplished much for other manufacturers. Why not find out what we can accomplish for you? Our engineers will be happy to survey your problems with you and recommend the equipment you need. Call or write today!

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● Full Automatic and Semi-Automatic Plating Machines ● Strip Steel Plating Equipment ● Wire Galvanizing Equipment ● Batch Type Plating Machines ● Pickling Machines ● Motor Generators for Plating ● Processing Conveyors ● Rectifiers for Plating

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INDUSTRY NEWS

Money Saved—A special work simplification recognition dinner for supervisors in the manufacturing division of The Maytag Company was held at Newton, Iowa.

Especially honored at the dinner were 56 Maytag supervisors who had made outstanding contributions to the Maytag work simplification program for 1955. Each of the supervisors honored had submitted ideas whose total cost reduction for the year amounted to $1,000 or more.

The recognition certificates, signed by president Fred Maytag and J. F. Biggane, manager of industrial engineering, were presented by George M. Umbreit, executive vice-president and treasurer.

Work Simplifiers

An average of over three ideas per supervisor was submitted during 1955, according to Biggane, who reviewed the program's accomplishments during 1955. The net cost reduction last year was $482,647, he said.

TANK HEATING PROBLEMS ELIMINATED!

CLEPCO FUSED QUARTZ IMMERSION HEATERS

Heating your acid tanks with Clepco Electric Immersion Heaters is the most modern and now the most proven of all methods known today.

ASK YOUR LEADING PLATING SUPPLIERS

OVER 100,000 INSTALLATIONS PROVE *CLEPCO* FUSED QUARTZ IMMERSION HEATERS ARE BEST

Clepco Steel and Stainless Immersion Heaters are designed to meet the specific demands of the Alkaline Bath heating problems of the Industry.

WHEN A BETTER HEATER IS MADE, CLEPCO WILL MAKE IT.

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SEE YOUR PLATING SUPPLY HOUSE
WRITE US FOR LITERATURE

THE CLEVELAND PROCESS COMPANY
1965 EAST 57TH STREET • CLEVELAND 3, OHIO

Tenth Anniversary—Its tenth anniversary as a highly qualified producer of investment castings will be celebrated during 1956 by the Engineered Precision Casting Company, Matawan, N. J.

Founded by Walter A. Dubovick and Alexander Grant, who today hold the positions of president and vice-president respectively, the company now has 70 employees. It is a charter member of the Investment Casting Institute and Dubovick is currently head of the Institute's Process Materials Standards Committee.

The company has the most modern production and inspection equipment including vacuum casting furnaces, a radiographic laboratory, and high pressure hydraulic wax injection machines.

In commemoration of its tenth anniversary, the company recently announced a novel Tooling Charge Rebate Plan which allows a reduction or refund on the tooling charge of specific orders placed until October 31, 1956.

New Engineering Department—In order to insure high quality of its products and to develop new production techniques, American Controls Division of Robertshaw-Fulton Controls Company has established a unified engineering department at its St. Louis plant.

The newly created engineering department brings under single direction all testing and quality control functions at the division. In addition the department will develop its own engineering data, which was formerly provided by other company divisions.

One key function of the new engineering department is the operation of control devices and their components under stress conditions often more severe than they would undergo in ordinary use. Physicists, chemists and quality control personnel are assigned to develop special testing fixtures necessary to put control devices through their paces.

CONTROLLED GRAIN SIZE: APW Extrusion Process* controls grain size within definite limits—*minimizes shedding!*

ROLLED FLAT PLATE ANODE SECTION:

This Photomicrograph shows highly irregular, uncontrolled grain size—a major cause of shedding and resultant rough electrodeposits.

APW EXTRUDED ANODE SECTION:

Note small, fully controlled regularity of grain size that promotes uniform corrosion, smoothest electrodeposits, less rejects.

*Pat. Pending

NEW! SHAPED, EXTRUDED APW SILVER ANODES

STANDARD SHAPES:

"RECTANGULAR" "TEAR DROP" "DOG BONE"

The common problem of shedding and all of its costly results in electroplating can now be virtually eliminated with the radically new extruded, shaped silver anodes made by an exclusive APW-developed process.

The small and uniform grain size produced in the new APW extruded anodes is controlled between definite ideal limits as illustrated above. As a result, corrosion is *smooth and uniform*—with consistently smooth electrodeposits. Rejects are a comparative rarity.

The new APW extruded anode provides equally important advantages by redistribution of mass metal in scientifically determined shapes. While conventional rolled flat plate anodes quickly wear to a sharp knife edge from which silver particles break loose readily, APW shaped anodes maintain substantially rounded edges for practically the complete life of the anode. Anode area is also appreciably prolonged. After 85% by weight has been plated off, *this APW anode retains 80% of original active surface area!* You profit with the longer, useful life of the anode . . . polarization is minimized . . . there is less silver scrap to be refined.

APW will develop special anode shapes to meet particular plating bath conditions. You are thus assured of utilizing the silver you buy in anodes most efficiently. Feel free to consult us on any anode problems you may have. ★ ★ ★

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BRIGHT FINISH CADMIUM AND ZINC PLATING AT LOW COST!

Cadmax and Zimax, Federated's new addition agents for cadmium and zinc plating baths, eliminate dull, frosty finishes . . . and do it at low cost!

Cadmax for cyanide cadmium plating produces clear, brilliant, blue-white deposits, prevents burning, minimizes staining, does not foam, and is easy to control. An adjuster solution, furnished free with Cadmax, eliminates breaking in the bath, gives perfect plating from the first load.

Zimax for zinc plating produces clear, bright deposits, increases covering and throwing power, and is much more economical to use than similar materials. It is available in powder or liquid form; for barrel or still brightening. It usually may be added without conversion treatment to any zinc solution using a proprietary addition agent.

Experienced laboratory and field personnel are available to give complete technical service, including solution analysis and recommendations. Call or write to Federated's Plating and Electrochemicals Department; or get in touch with your nearest Federated dealer.

Federated first in the non-ferrous field. AMD

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Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

INDUSTRY NEWS

Instruction

Spray Painting School—Individualized instruction is the keynote of all courses in the DeVilbiss Company's School of Spray Finishing Technique, now starting its thirtieth year of operation at the firm's main plant in Toledo. Close personal contact with instructors is possible because of the restricted enrollment for each class.

Applicants are enrolled for one-week classes of limited size. Groups are purposely kept small so that each member of the course is given full opportunity to participate in the series of classroom and laboratory sessions for which a certificate is awarded in recognition of their achievement.

No charge is made by the company for the week of instruction, the only cost to the students being their transportation and their room and meals.

The DeVilbiss School, pioneer in the field of spray finishing instruction, attracts students from all parts of the United States and Canada and a score of foreign countries each year.

New Record—A factory safety record of 3,000,000 man hours without a lost-time accident has been surpassed at the Crosley and Bendix Home Appliance plant.

The record was announced to employees by works manager, J. D. Taylor, Jr. He said as far as could be determined the safety achievement was a new industry record for a refrigeration manufacturing facility. Air Force defense contracts also are filled here.

(The Bureau of Labor Statistics reported the refrigeration industry average number of lost-time accidents per 1,000,000 man hours in 1955 was 7.2.)

More than 2,500 employees compiled the record in the plant which has approximately half a million square feet of production space. The record took nearly a full calendar year to compile, since a three-month strike idled many of the production workers.

Tapes that keep plating where you want it!

For clean, positive stop-off masking—regardless of plating solution or surface—you can depend on one of these "Scotch" Brand Tapes for electroplating to do the job...easily, economically: No. 470—a strong, conformable, "all-around" tape that is highly resistant to cleaning and plating cycles. No. 850 Polyester Film Tape—thin and tough; transparent backing; excellent for flat or simple curved surfaces. No. 420 Lead Foil Tape—for use where a "thieving" action is desired. For complete information, ask your "Scotch" Brand Tape distributor, or write 3M Co., Dept. LF-46.

Always specify "Scotch" Brand, the *quality* tape . . . and stick with it!

TAPES FOR ELECTROPLATING . . . *three of more than 300 pressure-sensitive tapes for industry, trademarked . . .*

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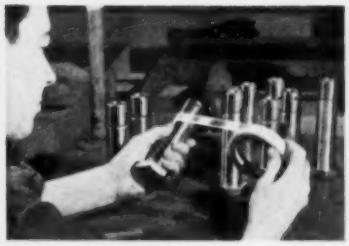
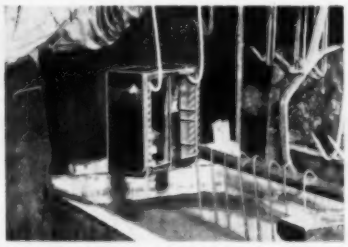
SCOTCH BRAND

Look what you can do with them!



THREADED shaft is masked with "Scotch" Brand No. 850 Tape. High clarity of tape's polyester backing permits continuous inspection for any "creeping under" action.

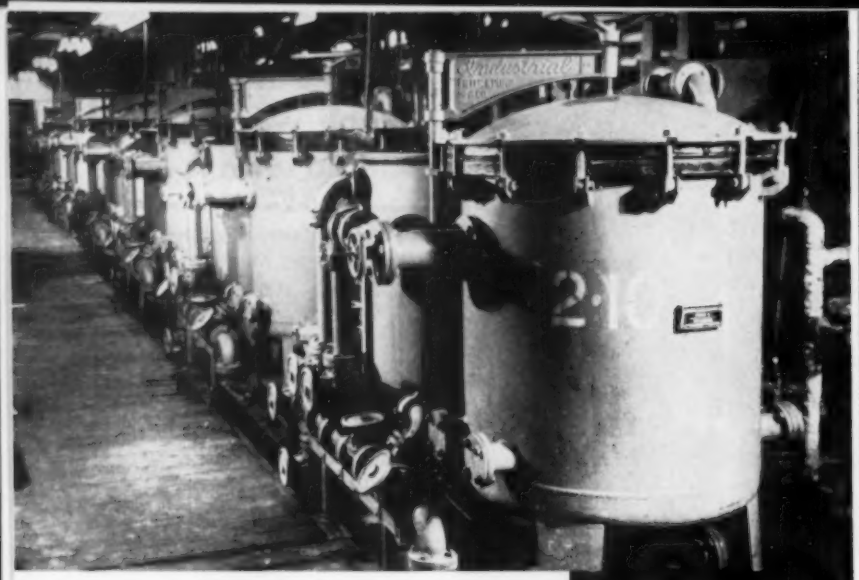


CLEANING racks can be protected by binding them with "Scotch" Brand Tape No. 470. Heavy-duty vinyl backing withstands acids, alkalies, salt water, alcohol, hydrocarbons.

LARGE metal castings can be masked with "Scotch" Brand Tape No. 470 when cleaning or plating. Even on rough surface, tape's adhesive will hold during entire operation.

PROPELLER shaft is quickly and easily masked with No. 420 Tape before critical plating operation. "Thieving" action of lead foil backing successfully reduces edge build-up.

The term "Scotch" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.



SOLVE COMPLEX FILTER PROBLEMS

...WITH INDUSTRIAL'S NEW BUILT-TO-ORDER FEATURES

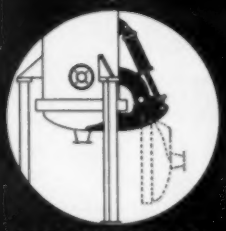
Industrial offers much more than a line of standard filters . . . a complete filtration engineering service from fluid analysis to installation. Industrial is ready and able to help you specify the right equipment for common or unusual needs.

Easily adapted for special uses . . . these Vertical Filters typify Industrial engineering . . . purposely designed to be built for your exact needs. Several of the many possible modifications are shown at the right . . . for recovery of large volumes of solids the bottom opening filter is ideal; for smaller volumes, the clean out door is more practical and less costly. Another example of specialization is the jacketed shell filter, for use where small temperature variations are important. Other optional features are quick-opening covers, individual leaf outlets and self-cleaning devices that offer sluicing, shaking or air wash cleaning.

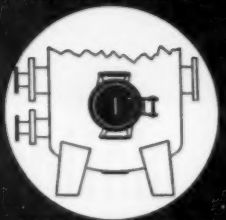
Lower filtration cost . . . proven performance, minimum down time, the use of low cost but efficient filter media plus a design exactly suited to your needs, all contribute to Industrial's low over-all cost per gallon of filtrate.

Write now for details on flow systems, special equipment, filter and leaf construction. Ask for 8 page Bulletin 111. →

MODIFICATIONS



RECOVERING LARGE VOLUMES OF SOLIDS



RECOVERING SMALL VOLUMES OF SOLIDS

JACKETED SHELL FOR UNIFORM TEMPERATURE

Industrial

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CENTRIFUGAL PUMPS • PRESSURE FILTERS • ION AND HEAT EXCHANGERS • RUBBER LININGS • WASTE TREATING EQUIPMENT

INDUSTRY NEWS

Dynamics Corporation of America Expands—As part of a broad expansion program, Reeves Instrument Corporation, a subsidiary of Dynamics Corporation of America, has taken over a modern $5,000,000 plant and added facilities at Roosevelt Field (Mineola, N. Y.), which will immediately increase the Company's plant space by more than 30 per cent.

The single-story, 280,000 square foot plant will bring together under one roof, Reeves research, development and production programs previously located in a number of buildings at Roosevelt Field; will accommodate more than 3,000 employees, as compared with 1,300 in the old facilities; and will permit "a continuous production flow, from drawing board to final assembly, of the largest and most complex electronic control systems for the armed services and industry," David T. Bonner, president, stated.

New Logotype—Nitrogen Division, Allied Chemical & Dye Corporation, New York, N. Y., has adopted a new logotype for use in advertising and printed material to show users of basic industrial chemicals the connection between the division and its parent company.

The new logotype is nonrestrictive and can be used with contrived names under it. It can be abbreviated, is easier to say and permits uniform identification of all Nitrogen Division promotional material.

Big Dipper—The Barber-Webb Company, 3864 Santa Fe, Los Angeles, Cal. has recently completed a $100,000 addition to their already well equipped facilities in their plant in Vernon.

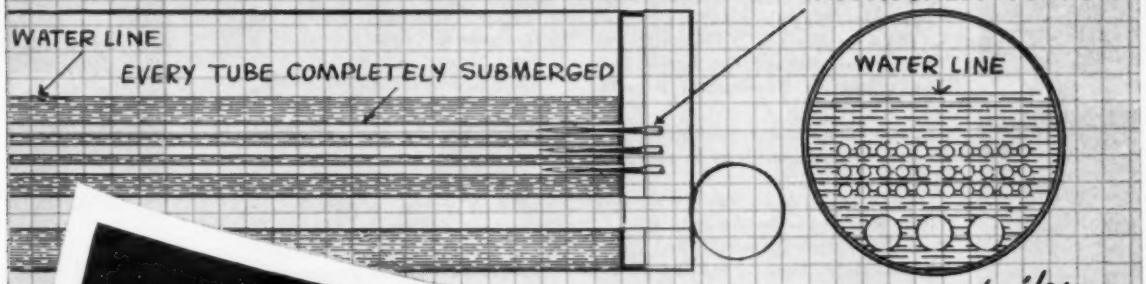
A tank more than 22 feet long, 6 feet deep, stepped from 2½ feet to 6 feet wide, and holding approximately 4,000 gallons of material, has been installed for their polyvinyl chloride plastisol dipping operation.

Overhead is a new materials handling bridge crane system. Nearby is a large, new oven, 27 feet long, 10 feet wide and 12 feet high.

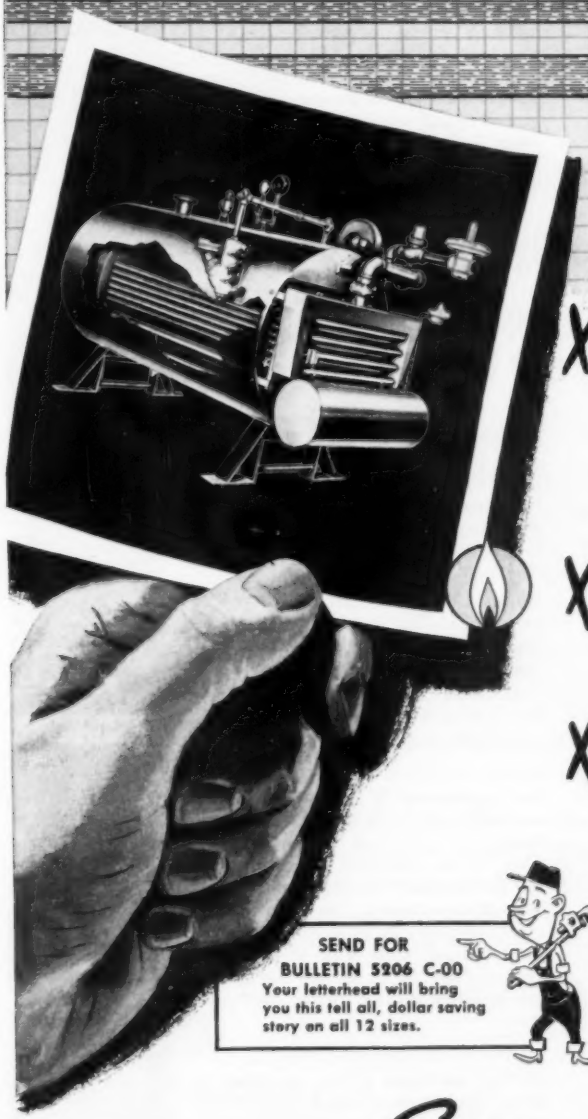
With these new facilities Barber-Webb now can apply corrosion preventing coatings to the largest pieces of equipment used industrially.

With these expanded facilities, Barber-Webb continues to maintain its position of leadership in the field of tank lining and corrosion prevention coatings for a large variety of plant equipment items such as exhaust systems, blowers and duct work.

when you buy a steam boiler . . . be sure to look at the picture of a Sellers Immersion Boiler



There's no other boiler like a Sellers—



every square foot of heating surface is water backed— —100% effective!

The long, individually gas fired tubes in the Sellers Immersion Boiler are all completely submerged nearer the water level—and over the return tubes! Heat is therefore uniformly distributed through them—and directly into the water—no where else!

there's no scale problem!

In immersion heating, the needed long tubes expand and contract sufficiently on intermittent firing to crack loose any hard scale that forms on the tubes. This practically eliminates the scale problem, makes maintenance simpler and increases the boiler's efficiency.

the average flue gas travel is 15 feet!

Maximum, almost complete utilization of the exhaust heat is assured with a Sellers Immersion Boiler. This is a result of Sellers exclusive design—with the firing tubes completely submerged and *located over the return tubes,* there is a long, slow flue gas travel—an average of 15 feet! Heat can only go into the water.

There's no other steam boiler like a Sellers Immersion Steam Boiler. Its simple design gives you a package boiler unit with many other outstanding features. Minimum maintenance and maximum efficiency combine to give you years of remarkably low operating costs. Twelve sizes available!

SEND FOR BULLETIN 5206 C-00
Your letterhead will bring you this tell all, dollar saving story on all 12 sizes.

Sellers ENGINEERING CO.

4876 N. CLARK STREET CHICAGO, ILL.

Blast Heaters • Immersion Automatic Water Heaters • Combustion Units • Industrial Gas Burners
Vertical Steam Boilers • Immersion Tank Heaters • Gas Combustion Equipment

PERSONALS

Gayle

Kenneth H. Gayle, Jr., president of Delta Tank Manufacturing Co., Inc., has been elected a director of General Gas Corporation. Gayle was elected president of Delta on January 7, 1956, and was formerly president of The Ingalls Iron Works Company, Birmingham, Alabama.

Rake

Morgan D. Rake was appointed project engineer of plating methods for the Endicott plant of IBM.

Rake joined IBM in 1936 as a member of the Raw Stores Department. He had later assignments in assembly and grinding, and in 1943 became manager of the plating and polishing department. In 1955 he became a manager in the General Machine Division.

He is a member of the IBM Country Club and American Electroplaters Society.

Fluke

W. L. Fluke has been named field sales manager of the Barber-Webb Company, Los Angeles.

A resident of Monrovia, Fluke moves to the new assignment after twenty years in the industrial products field, fifteen of which were with the B. F. Goodrich Company's industrial products division. He has been a territory manager in that company's Los Angeles district since 1945. Prior to 1941 he was associated with the Gates Rubber Company in Pittsburgh, Pa. He attended Carnegie Institute of Technology.

Instone

John C. Instone has been appointed manager of the Philadelphia plant of Proctor Electric Company.

In his new capacity, Instone will have full responsibility for all Philadelphia manufacturing operations. Instone has been with Proctor for nine years and was formerly supervisor of process and methods engineering. He lives in Philadelphia and is a member of the American Electroplating Society, the American Ordnance Association and Society for the Advancement of Management.

Breitmeyer

John W. Breitmayer has been appointed sales manager of the Hallowell Collar Division at Standard Pressed Steel Co. Breitmayer joined the company 15 years ago as a mail boy. He has been assistant sales manager since 1953 of the company's Unbrako line of socket screw products, dowel pins and pressure plugs.

Champe

R. E. Champe has been appointed sales and cost analyst for the Automotive Rubber Co., Inc.

Prior to his joining ARco, Champe spent 15 years with U. S. Rubber Company, Inc., functioning in cost accounting and sales capacities for that firm.

The Permutit Company, New York' N. Y., has announced the promotion of **Charles Bueltman** to the position of manager, Industrial Waste Treatment Department. Upon graduation in 1948 from Rensselaer Polytechnic Institute where he received a BS and BCE, Bueltman joined the sales department of Permutit.

Bueltman

Merle W. Kremer has been appointed assistant general manager of the Parts Division of Sylvania Electric Products Inc. In addition to his new responsibilities, Kremer will continue his present duties as general manufacturing manager, a post to which he was appointed last July. His office will be at division headquarters in Warren.

Kremer

James B. Scudder has been appointed sales representative for the Warner Electric Brake & Clutch Company, Beloit, Wis. Scudder will work out of Warner's New York office at 36 Main Street, Madison, N.J.

Scudder

Metalwash Machinery Corporation of Elizabeth, N. J. announces the appointment of **W. Dolph Hornbruch** to represent the company in the Eastern Area of New York State including New York State east of Utica, and north of Poughkeepsie.

Hornbruch is a graduate of Stevens Institute of Technology and has a diversified sales engineering background including aircraft instruments, electronics, heat treating, and finishing systems.

As a sales engineer, Hornbruch will handle the complete Metalwash line of processing equipment.

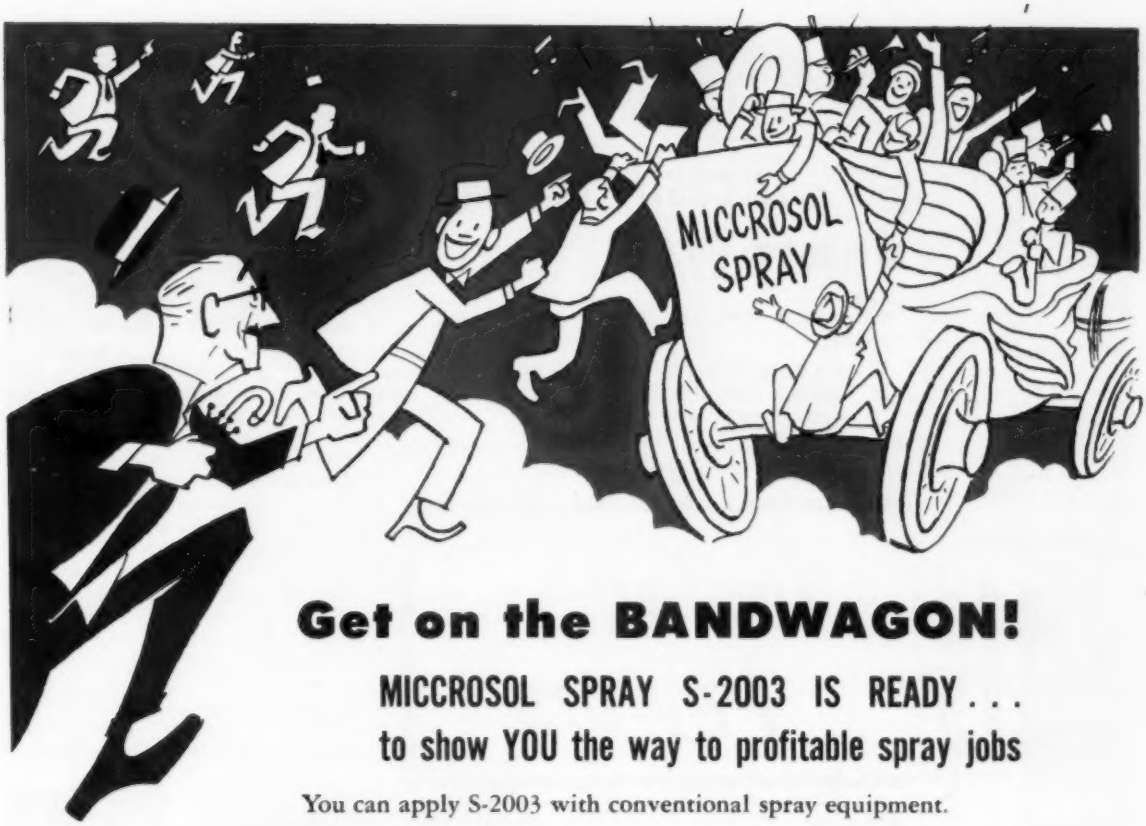
Hornbruch

The appointment of **James M. Klaasse** as chief engineer is announced by the American Instrument Company, Inc., Silver Spring, Maryland. He will direct the development and engineering operations of the company. His background includes management experience in instrument making while with W. & L. E. Gurley, Troy, N. Y. as sales manager of the industrial division and as chief engineer.

Klaasse

Wilbur Jackson, a vice president of Robertshaw-Fulton Controls Co. has been named general manager of the Grayson Controls Division, Long Beach, Calif. Formerly, he held the position of works manager of the division. Jackson has been with Grayson Controls since 1928 and was one of the organization's first two employees.

Jackson



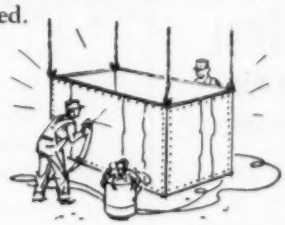
Get on the BANDWAGON!

MICCROSOL SPRAY S-2003 IS READY . . . to show YOU the way to profitable spray jobs

You can apply S-2003 with conventional spray equipment.

You can apply 60 mils thickness in one application without sagging of material. If multiple coats are required, a short cure time is all that's needed between applications. A contrasting color can serve for layer identification, if desired.

Tanks
Ducts
and other
Equipment



You can use S-2003 in all plating baths. It has the same toughness—chemical, corrosion, and abrasion resistance as Miccrosol E-1003. Our adhesive systems provide outstanding adhesion to metal surfaces.

Solvent additives are not necessary. S-2003 is 100% solids and is sprayed as received. Time consuming and expensive adjustments are unnecessary. Problems of material instability and film cracking are eliminated. There is no solvent loss and less operator fatigue with Miccrosol Spray S-2003.

It's the ideal plastisol for spray applications.

IT'S TOPS!

• *WRITE FOR PARTICULARS ON COMPANY LETTERHEAD*

Developed and manufactured by experienced platers

MICHIGAN CHROME *and Chemical Company*

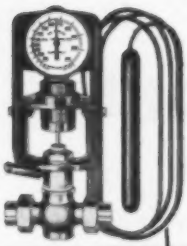
8615 Grinnell Avenue • Detroit 13, Michigan

GOLD
is costly to plate
DON'T WASTE IT!

Even with traps installed to recover gold, you're *wasting* it...

IF you have to replate frequently
IF solution decomposes
IF there is excessive evaporation

Correct temperature regulation will help eliminate this loss of valuable gold, time and labor.



install Powers

AUTOMATIC TEMPERATURE CONTROL
for All Metal Finishing Processes

For plating tanks and other metal finishing processes. Powers Controls quickly pay back their cost by accurately holding solutions at a constant uniform temperature.

Write for Bulletin 330

POWERS 4

TECHNICAL DATA SHEET
GOLD

IF you plate—GOLD
Too high a temperature can result in:

1. Excessive build up of carbonates.
2. A tendency to spongy deposits.
3. Excessive evaporation.
4. Color variance.
5. Low cathode efficiency.

Too low a temperature can result in:

1. A low limiting current density.
2. Pale deposits.
3. Dark deposits.
4. Inclusion of foreign metals in the deposit (lower carat).

THE POWERS REGULATOR COMPANY
Skokie, Ill. • Offices in Chief Cities in U.S.A. and Canada • See Your Phone Book

(c32)

PERSONALS

Berman

Boyd

Alfred T. Berman has been appointed sales representative for McAleer Mfg. Corp. Detroit, covering the New England area. Berman has been associated with the metal finishing industry since 1930.

C. F. 'Doc' Boyd has been named McAleer sales representative in the Chicago territory.

C. H. McAleer, president of the McAleer Mfg. Corp., is one of the pioneers in the materials finishing field that served the automobile industry. The company manufactures polishing and buffing compounds in bar, cast and extruded form. A fully equipped research laboratory is maintained for the control and development of accuracy and efficiency in compounds.

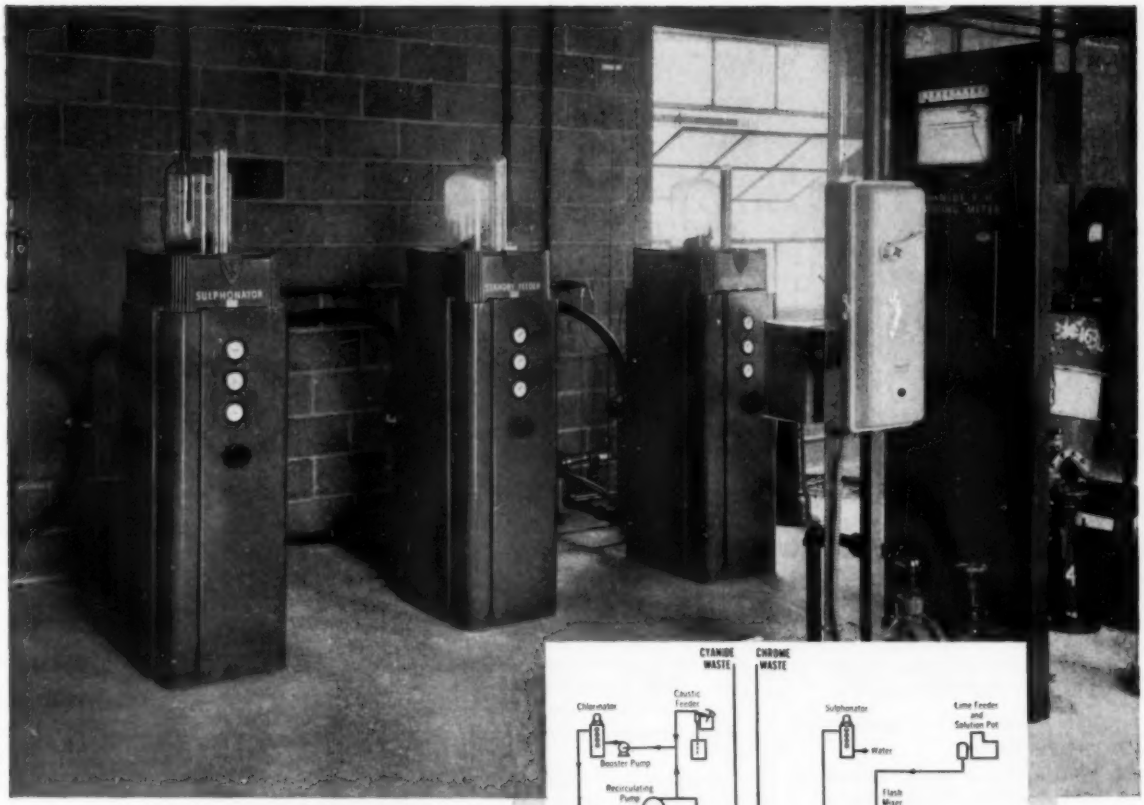
Kelly

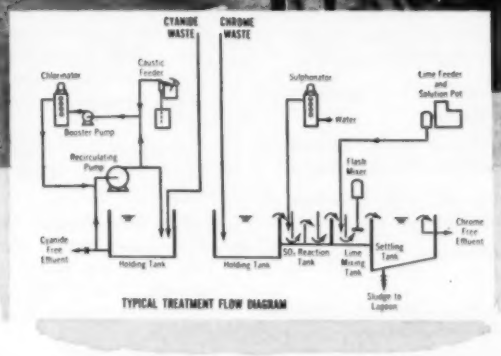
Van Effen

John A. Kelly has been appointed marketing administration specialist. **James E. Van Effen** is now manager—commercial service, of the Trumbull Components Department, General Electric Company.

Kelly, who has held the post of manager—commercial service for Trumbull Components during the past year, holds a Bachelor of Business Administration degree from the City College of New York. He joined the General Electric Company in 1948 as procedures analyst for GE's Construction Materials Division in Bridgeport, Conn. While there, he also served as assistant to the sales manager, and he was named manager—procedures before he joined GE's Trumbull Components Department in 1953.

Van Effen attended the Michigan College of Mining and Technology, from which he received a Bachelor of Science degree in chemical engineering. He joined the old Trumbull Electric Company in 1945 as a sales representative in Pittsburgh. In 1948, he was named sales manager of the Atlantic district.





TYPICAL TREATMENT FLOW DIAGRAM

DAYSTROM INSTRUMENT DIVISION USES

W&T *Cyanide & Chrome Waste Treatment*

The Daystrom Instrument Division of Daystrom, Incorporated, located at Archbald, Pennsylvania, has provided a compact and efficient treating plant to destroy the toxic components of their plating waste. The treatment plant has been in continuous operation since 1953.

The cyanide bearing waste is treated with chlorine and caustic, using a W&T Water Diaphragm Chlorinator and a W&T Chemical Solution Feeder. The treatment breaks down the cyanide to harmless carbon dioxide and nitrogen gas components.

The chromium bearing waste is treated with sulphur dioxide and lime, using a W&T Sulphonator and a W&T Dry Chemical Feeder. The treatment removes the toxic chromium and other heavy metals from solution, to be disposed of as sludge.

If you would like more information on Wallace & Tiernan cyanide or chromium waste treatment, write for bulletin RA-2120-CP.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

I-52

how to keep non-ferrous metals* *from fingerprinting, staining and discoloring*

Many non-ferrous metals readily oxidize in the presence of moisture and industrial fumes, or a marine atmosphere. This condition is accentuated by perspiration caused from handling, and materializes in some of the following forms:

(a) Assemblies with fingerprinted components.

(b) Multi-colored parts, caused by variance of processing time.

(c) Handling of merchandise at point of sale.

(d) Poor adhesion of paint and lacquer.

(e) Discoloration and/or spotting out lacquered surfaces.

KENVERT CHROME SEALER processes eliminate these, and many times, buffing and burnishing operations. Their application is very simple, easy and inexpensive.

KENVERT films are widely accepted for toys, interior hardware, electrical components, lamps, venetian blinds, bicycles, store cards, zippers, radios, tools, die castings, skates, refrigerator shelving and a host of others.

*Zinc, Cadmium, Copper, Brass, Aluminum

CONVERSION CHEMICAL CORPORATION

100 E. Main Street, Rockville, Connecticut

444 INDICATE A 421

PERSONALS

Robert L. Wehrli has been appointed general manager of the Aeronautical Division, Anaheim, Calif. Wehrli was formerly Aeronautical's director of research and development and has been with the company two years.

Wehrli

Hunt

John E. Hunt has been elected vice-president of Wagner Brothers, Inc., Detroit manufacturer of metal finishing equipment and supplies.

Hunt obtained his BS degree at Wayne University, Detroit, in 1939. His widely diversified experience in the metal finishing field includes control analysis, equipment maintenance supervision, process engineering and development, and production control.

He is presently a registered professional engineer in the states of Illinois and Michigan.

Hunt joined Wagner Brothers as supervisor of the Detroit Technical Staff in 1946. He was named Chicago district manager in 1952. Hunt will continue as Chicago District Manager.

Robert J. Mason, since 1950 carbide sales and service engineer in the Philadelphia area, for Carboloy Department of General Electric Company, Detroit, has been named manager of the Atlantic district. Mason, who will make his new headquarters at the company's Newark, N. J., office, joined Carboloy Department in 1948.

Thomas L. Norton has been promoted to the position of assistant plant manager at the Garland, Tex., plant of TEMCO Aircraft Corporation. The new assistant plant manager brings to his new post more than 13 years experience in top production and administrative positions with major aircraft companies.

John S. DeNoia was appointed automotive sales manager for the Permacel Tape Corporation, New Brunswick, N. J. DeNoia joined Permacel Tape Corporation in 1940 as a general line salesman in the New York Division. In 1949 he was made a division sales manager, and in 1954 became assistant manager industrial and automotive sales.

YOU CAN WIN $125

worth of home study training in modern electroplating by completing the following statement with fifty words or less: "THERE ARE NOW MORE OPPORTUNITIES THAN EVER IN THE ELECTROPLATING FIELD BECAUSE . . ." There is nothing to buy, nothing to try! Previous contest winners have ranged all the way from a plater's helper to an executive chemist. The course, ELECTROPLATING KNOW HOW, which will be given to the writer of the best statement, under the personal direction of Joseph B. Kushner, is well known for its excellence and comprehensiveness.

PRIZE LIST*

1st Prize

ELECTROPLATING KNOW HOW training course. Value: $125.

2nd, 3rd Prizes

SUR-TEN METER for measuring surface tension of plating baths and dips. Value: $16.35.

4th, 5th, 6th, 7th Prizes

One set of TANK DOCTORS, solid vinylite trouble shooting charts that mount right at the plating tank. Value: $9 per set.

* In addition, each contestant will receive free of charge a copy of the valuable booklet, "Surface Tension Secrets For Electroplaters."

JUDGES

The judges who will select the winning statements are: Ezra Blount, Editor, PRODUCTS FINISHING, Archimedes Doria, Editor, PLATING, and Nathaniel Hall, Editor, METAL FINISHING.

YOU CAN WIN!

It's easy to write a statement! Send for your official entry blank (free—no obligation) at once, by writing to

ELECTROPLATING SCHOLARSHIP CONTEST

BOX 230, STROUDSBURG 1P, PA.

The contest closes May 30, 1956. Send for your entry blank *today!*

INDICATE A 422. PLATING

EMERGENCY call to Merchants' Chicago office from steel products manufacturer. Broken acid tank has closed down plant. Need six carboys of Formic Acid immediately.

SPECIAL small delivery truck — held by Merchants for emergency shipments — is loaded. Merchants' assistant warehouseman has union driver's license for just such a situation.

MERCHANTS' SERVICE RE-OPENS PLANT IN 45 MINUTES!

Special service on industrial chemicals is routine at Merchants Chemical. Thirty-five years experience has given Merchants a close understanding of customer problems . . . the kind of understanding that provides ahead of time for emergencies. The instance cited above illustrates the foresighted coordination that is typical of the service available from any one of Merchants' nationwide chain of offices and stock points. Products offered include acids, alkalis, fungicides, surfactants, chlorinated solvents, emulsifiers, laundry compounds, soaps, dry ice and chemical specialties.

WAVED ON at gate by plant guard, Merchants truck speeds past waiting vehicles right through to unloading area.

DELIVERY COMPLETED to waiting lift truck. Total time from initial call — less than 45 minutes!

SERVICE QUALITY MERCO

MERCHANTS CHEMICAL COMPANY, INC.

60 East 42nd Street, New York 17, N. Y.

SALES OFFICES AND WAREHOUSES: CHICAGO • CINCINNATI • DENVER • LOUISVILLE • MILWAUKEE • MINNEAPOLIS • NEW YORK • OMAHA

STOCK POINTS: ALBUQUERQUE, N. M. • ERWIN, TENN. • S. NORWALK, CONN.

Check ✓ AND Compare

the features of
NEW LUSTER-ON
ALUMINUM SEALER
with the process
you are now using

Luster-on®
ALUMINUM SEALER

- ✓ produces a chromate film on aluminum that provides excellent corrosion protection and serves as an ideal paint base
- ✓ is an excellent substitute for anodizing in many applications where hardness is not a prime factor — gives better corrosion protection than anodizing.
- ✓ is easily applied at room temperature by dipping, spraying or brushing — treatment time extremely short.
- ✓ can be furnished in clear, yellow and dyed color finishes
- ✓ gives maximum salt spray resistance
- ✓ adheres well, does not leach easily
- ✓ offers extreme economy of use
- ✓ meets government specifications MILC-5541

See for yourself the superior results obtained with new Luster-On Aluminum Sealer.

Send sample for free laboratory treatment.

THE Chemical CORPORATION

57 Waltham Avenue, Springfield, Mass.

PERSONALS

Frank F. Black, for 20 years associated with the organic chemical and pharmaceutical trade, has joined the sales staff of Cowles Chemical Company, Cleveland, Ohio. He has been named manager of Cowles' newly established organic chemical department. Black's immediate responsibilities will include the sale of Cowles' silicone compounds for water repellent treatment of masonry.

John A. Wilson was elected assistant secretary of Diamond Alkali Company, Cleveland, Ohio. Wilson comes to Diamond with 10 years' experience in legal and legislative work.

David M. Roney, Jr., has been appointed assistant sales manager of Hanson-Van Winkle-Munning Co.

Prior to this appointment, Roney was an administrative assistant with the company, concerned with all phases of sales management. He joined H-VW-M last year.

Roney was associated with the Scintilla Division of Bendix Aviation Corp., serving for almost two years as sales engineer in New York State and Michigan. In 1951 he joined Westinghouse Electric Corp. at East Pittsburgh, Pa., where he became application engineering manager in the Electroplating Projects Department.

In his new appointment at H-VW-M, Roney will concentrate his activity on the overall management, coordination and advancement of the full-automatic conveyor program, excluding strip and wire lines. He will also continue supervision of the overall direction and management of the plating barrel program.

Roney

Hempelman

Charles S. Hempelman has been named market analyst for the Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis.

Hempelman's duties include evaluation of Le Roi's present markets and research and analysis of new markets for both existing products and new or modified products which the Division may develop. He has held previous sales and market research positions with the Joseph Schlitz Brewing Co., Milwaukee.

David D. Gordon has been appointed sales manager, Fulton Sylphon Division, Robertshaw-Fulton Controls Company, for the Los Angeles District.

Gordon will be responsible for the sale of many products manufactured by the company's Fulton Sylphon Division. His territory covers California, Washington and Oregon. Gordon has been with the Robertshaw-Fulton organization for 13 years, serving at times as coordinator of research and supervisor of original equipment division for Fulton Sylphon.

Gordon

Bishara

Charles S. Bishara has joined E. H. Titchener & Company, Binghamton, New York, as assistant to the sales manager. Bishara will specialize in the sales promotion and advertising activities of the company, which designs and manufactures wire parts and welded wire assemblies.

George L. Ogdin, Jr. was appointed general sales manager of the Fulton Sylphon Division, Robertshaw-Fulton Controls Company, Knoxville, Tenn. Joining the company in 1940, Ogdin held various positions at Knoxville until 1944, when he was transferred to the Detroit sales office. In 1948 he became Detroit district sales manager. Returning to Knoxville in 1953 he was appointed assistant general sales manager.

Ogden

Jeremias

Dr. Bruno Jeremias has been named chief research chemist of the Research and Development Department, Wagner Brothers, Inc.

Dr. Jeremias gained his PhD in chemistry at the University of Heidelberg, Germany. It was also here that he received the Victor Meyer award in recognition of his outstanding work in the field of chemistry. At Wagner Brothers, Inc., Dr. Jeremias will devote all of his time to research in metal finishing processes.

"RELIANCE" PRODUCTS

EFFICIENT • EFFECTIVE • DEPENDABLE

At no charge, our Engineering Department is always glad to make recommendations and help solve your polishing and/or plating problems

RELIANCE SELENIUM RECTIFIERS

BENCH OR FLOOR MODELS

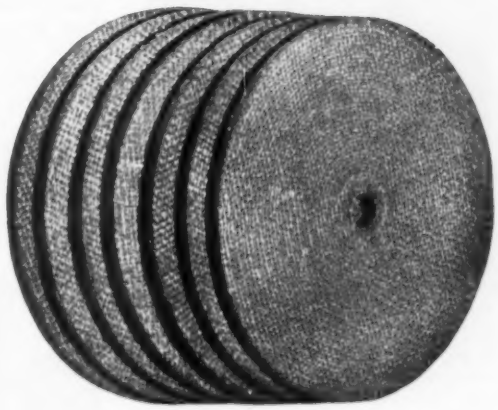
100 TO 5000 AMP OUTPUT

VOLTAGE RANGES
0– 6
0– 9
0–12
0–15
0–18
0–24

REMOTE CONTROL AT SMALL EXTRA COST

For that tough cutting down job on steel or stainless steel, solve your problem with

RELIANCE SISAL BUFFS



Specially treated:

For cooler operation—

For longer life by binding the fibres together to prevent fraying—

For better compound adherence—

To cut faster and bring up a high finish

RELIANCE matching compositions furnished in either molded cakes, or extruded to your specifications.

Chas. F. L'Hommedieu & Sons Co.

MANUFACTURERS of

Plating and Polishing Machinery

Complete Plating Plants Furnished

Chas. B. Little Co.
Newark, N. J.

W. R. Shields Co.
Detroit, Mich.

Gen. Office and Factory:
4521 Ogden Ave
CHICAGO

Branches:
Cleveland
and
Los Angeles

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 425.

TRADE ~ LITERATURE

Pretty Funny

L—400. Humor in a Catalog—The colorful new catalog which has just been published by the Precision Equipment Co. is unique in that it includes amusing cartoons on many of its pages. It also features a special joke section entitled "Heard in the Locker Room." Many new items have been added to Precision's standard line consisting of lockers, storage cabinets, steel shelving, work benches and office furniture. Offered in a wide variety of styles and capacities are steel cabinets to serve every storage requirement. Each item is clearly illustrated and priced.

Solar Power

L—401. Sun Battery Applications—A new technical booklet titled, "The Use of Selenium Photocells and Sun Batteries," has been published by International Rectifier Corporation. Designed to be of primary interest to engineers and amateur experimenters, this handbook contains 58 pages of technical information and over 35 illustrations, charts and diagrams which describe in detail applications and devices in which sun batteries and other photocell products are successfully employed.

L—402. Product and Process Development Work—Nine case-histories of how the Stokes Laboratory has enabled manufacturers in different fields to develop new products or manufacturing processes are contained in a 12-page brochure, "At Your Service," recently published by F. J. Stokes Machine Company, Philadelphia, Pa.

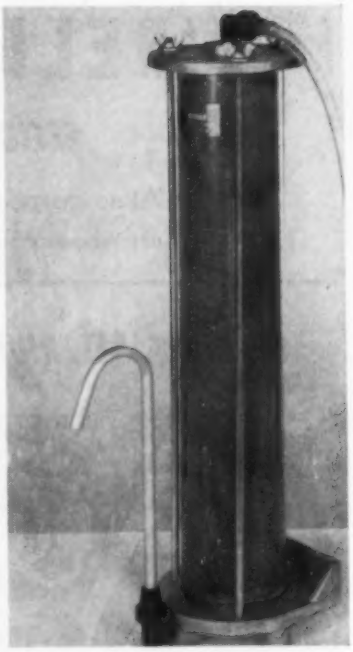
The brochure also describes Stokes' research and development facilities which are available to manufacturers of chemicals, pharmaceuticals, powder metal parts, molded plastics, and other products for conducting studies leading to new applications of vacuum drying, vacuum impregnation, and vacuum metallizing, compression and injection molding, and tablet compacting and coating.

You Can Feel 'Em

L—403. "Sampler" of Rubber and Plastic Lining Compounds—A unique sampler of a wide variety of ARco rubber and plastic lining compounds, proven in many years of industrial use, was recently released by the engineering staff of Automotive Rubber Company, Inc. (ARco), Detroit.

The sampler is a 3½ inch x 8½ inch folder carrying eleven actual specimens of rubber and elastomeric materials compounded, milled and calendered in ARco mills. The specimens represent standard compounds used in the majority of corrosion and abrasion resistant lining work performed by ARco engineers and technicians on tanks, vessels, pipe, fittings, duct work, fans, and other equipment.

According to reports, ARco laboratory files carry hundreds of special rubber compounds modified to meet unusual and severe corrosive and abrasive conditions.



Pure Water Out

L—404. Demineralizers—A demineralizer for laboratory and fine plating work is described in Kutlirlabs Bulletin No. B-173. This simple, compact unit may be installed either permanently or temporarily to any convenient tap water source. A high purity water is produced under intermittent operation or at continuous flows up to 30 gal/hr.

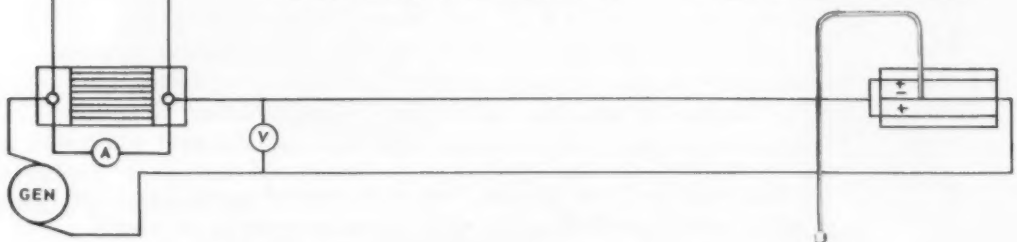
Fancy Fluxing

L—405. Fluxing Procedures—This newest APW Manual "A Complete Guide to Selective Fluxing for Low Temperature Silver Brazing" is a much needed reference work on proper fluxing practice. It will also be useful as a guide for the correct selection of flux based on specific temperature ranges and metals to be joined. A complete Flux Selector Chart is included in the manual for this purpose.

NEVER TOO MUCH-NEVER TOO LITTLE
when you control by Ampere Hours

The New Ampere-hour Recorder is a low-cost precision instrument for plating control. Complete chemical control of plating solutions can be maintained by the Ampere-hour Recorder, easily and accurately.

- Fully electronic circuit
- Fits any generator or rectifier
- Does not require calibrated leads
- Attaches to your present shunt
- Easy to install
- Uses standard radio tubes



AUTORAMIC BRITENER FEEDER

- Stainless Steel pump
- Precisely calibrated for easy adjustment
- 20 gallon plastic lined tank
- Low level signal bell
- Easy to install and operate
- Meters britener additions automatically

You can make britener additions automatically with the new Autoramic Britener Feeder. Never too much and never too little becomes a reality when you install an Ampere-hour Recorder and Autoramic Britener Feeder.

You will be pleasantly surprised to learn how little it costs to buy and install an Ampere-hour Recorder and Autoramic Britener Feeder.

(Write for quotation and bulletin #1014)

F. D. PACE ELECTROPLATING ENGINEERING & EQUIPMENT

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GRAND RAPIDS
MICHIGAN

A Timely Message on

The Role of the Engineer

by Ben P. Sax

President, American Buff Company

Have you ever stopped to consider what engineers mean to your business? Have you ever given thought to how much they contribute to your product . . . its acceptance . . . its sales?

We glorify the salesman with just reason . . . he brings in the life-blood of our business . . . orders. However, it would be difficult for a salesman to make the sale without the important contribution of the engineer. He is the man-behind-the-scenes who designs the product that the salesman sells.

Thinking back before World War II, many companies had little or no idea how their products developed . . . they just "grew." Very little thought was given to such factors as research, product design and development to fit the customer's needs. Since the war, those firms that have given engineers "leeway" for product development have progressed and expanded their scope immeasurably.

The design engineers in our own plant have made unlimited contributions to our growth as leaders in the buffing field. Without them, we would be just another manufacturer of buffs . . . scratching for business from day to day. Each new product that American Buff Company has presented to industry has been the result of months and even years, of planning and research, designing, experimentation and final testing. Our engineers have emerged with such significant achievements as our patented Centerless Buff, our unusual advances in the use of sisal buffs and our new "Golden Treatment" on sisal buffs.

Yes, the evidence is inescapable . . . the engineer is a strong asset to the progress of any company that intends to keep a big step ahead of competition.

Sincerely,

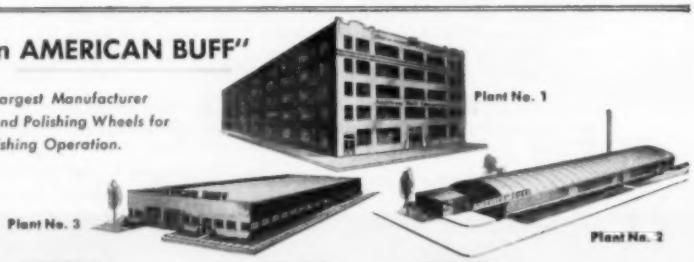
Ben P. Sax

"For the job that's TOUGH—use an AMERICAN BUFF"

UNIT • UNIT SISAL • BIAS SISAL • OPEN BIAS SISAL

Patented Centerless or Permanent Center Construction

World's Largest Manufacturer of Buffs and Polishing Wheels for Every Finishing Operation.



American Buff Company

2414 S. La Salle Street Chicago 16, Illinois

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BULLETIN ER-108

Rectifiers?

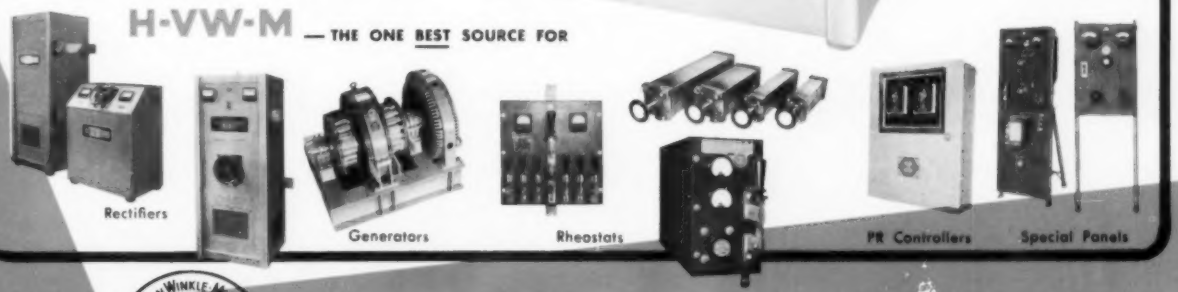
you'll find all the answers at H-VW-M

Selenium and Germanium

- **a complete line of rectifiers designed for metal finishing operations**
- **a complete line of rectifier controls to give you widest flexibility.**

Since H-VW-M manufactures *both* types of rectifiers—as well as low voltage generators . . . plus incorporating several choices of voltage controllers for electroplating, electroforming, anodizing and many other electrolytic applications—you can be sure an H-VW-M recommendation is the right recommendation.

H-VW-M — THE ONE BEST SOURCE FOR



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MATAWAN, N. J.

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HANSON-VAN WINKLE-MUNNING CO. MATAWAN, NEW JERSEY, U.S.A. SINCE 1920

H-VW-M

the answer to every low voltage,

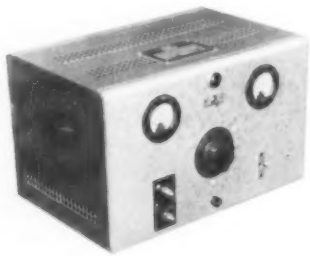
Selecting the right low voltage control equipment to give you proper control in your specific application is a major problem. But this problem is eliminated when you rely on H-VW-M. For H-VW-M produces the world's most complete line of low voltage direct current power equipment. That's why, when H-VW-M engineers make a recommendation you can be cer-

SELENIUM

Highest quality and efficiency, flexibility, economy and low maintenance are the characteristics combined in H-VW-M's full line of self-contained and remote control Selenium Rectifiers. Possessing a high power factor and low ripple, these standard and bench-type rectifiers provide a voltage range of 6 to 48 volts DC.

H-VW-M 2500 ampere, 9 volt self-contained rectifier with tap switch control.

H-VW-M remote controlled 5000 ampere, 9 volt rectifier with tap switch control.



H-VW-M small bench rectifier—50 amperes at 6 volts.

HANSON-VAN WINKLE-MUNNING CO. · MATAWAN, NEW JERSEY, U.S.A. · SINCE 1820

Greater effective selenium plate area per ampere—Individual plates are made of an aluminum alloy, with a layer of highest quality domestic triple-purified selenium.

Electrically balanced selenium plates—Each plate precision-tested to insure *electrically identical plates* in the same stack.

Corrosion-protected stacks—A coating of fungus- and moisture-proof material renders selenium stacks impervious to the corrosive conditions of average plating rooms.

Oversize transformers—Designed for continuous duty at KVA ratings of about 50% greater than the DC output KW.

Adaptability—Auto-transformer can be used for both 220 and 440 volt input, and is protected with coating of moisture- and corrosion-proof material.

Transformer compensating taps for stack aging—Also compensate for small variations in input voltage.

Complete overcurrent and undervoltage protection—Magnetic starter with 110 volt control circuit provides extra safety. Precision-calibrated thermostats over stacks cut out starter when temperature of stacks due to overload rises above safe limits.

High cooling capacity—Large plate area per ampere, plus powerful forced air cooling system, permits continuous operation with minimum heat rise—lengthens life of selenium stacks.

Ask for Bulletin ER-107

RECTIFIERS-

high current rectification problem.

tain their recommendation is unbiased and in your best interest So when it comes time to select power equipment, call your nearest H-VW-M technical representative. He'll help you specify the right unit and type of control for maximum efficiency and economy in your plant.

GERMANIUM

Hanson-Van Winkle-Munning's new low voltage self-contained and remote control germanium rectifiers are specifically designed for the electroplating industry. The germanium junction, with its efficiency and economy of operation, compactness and vast improvement in voltage regulation, opens a new and wider field for metallic rectifiers in the plating industry.

Outstanding efficiency—At full load, with output voltages of 15 volts and above, the germanium rectifier is capable of efficiencies in excess of 90%. Even at lower voltages, efficiencies are exceptionally high.

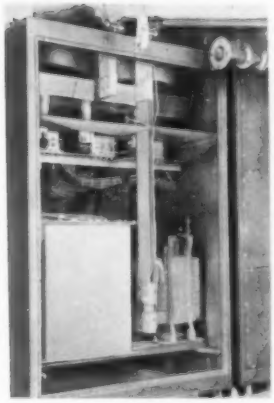
Improved voltage regulation—From no load to full load, voltage regulation of 8% or better can be maintained—no need for expensive automatic voltage stabilization devices in most cases.

Forced air cooling—Air is drawn up through the equipment, across junctions, out through the fan at the top.

Electrical protection—Overload and DC line shorts guarded against by inexpensive, replaceable link-type fuses. Overcurrent relay in DC circuit can provide additional protection when desired.

Designed for continuous 24-hour-a-day operation—At full capacity. Voltage range is from 6 to 48 volts, with current output from 1000 to 10,000 amps. Higher ratings are available for special applications.

Sturdy cabinet housing—All component parts located within housing. H-VW-M Germanium Rectifiers—though they require little maintenance—are easy to service.



Rear view, with panel open of a 3000 ampere, 15 volt germanium rectifier.

Remote control box with meters and start-stop and raise-lower buttons—for use with H-VW-M Rectifier incorporating motor-driven variable auto-transformer control.

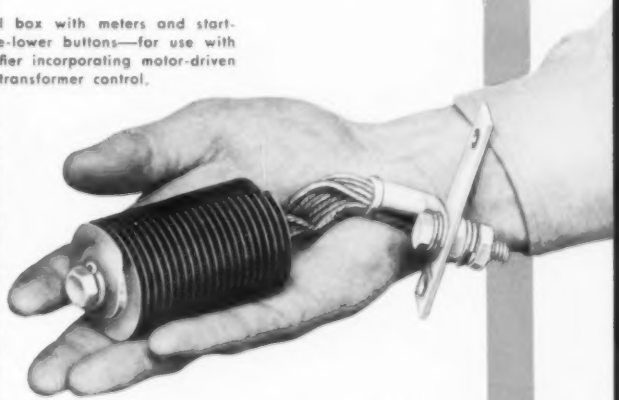


Illustration of a compact germanium junction, the core of new unit.

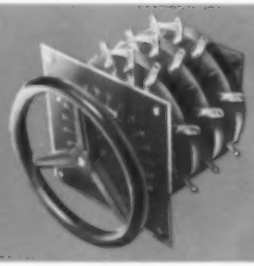
Ask for Bulletin GR-100

SEE NEXT PAGE FOR CONTROL FLEXIBILITY AND SUGGESTED APPLICATIONS

CONTROLS *for both*

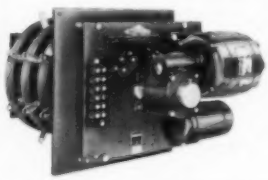
Selenium and Germanium RECTIFIERS

Selecting the proper control is of utmost importance for the most efficient, flexible and economical operation of your rectifier. H-VW-M offers the widest possible selection of controls and control combinations to meet every requirement. Some application suggestions are listed below. Ask for further recommendations from your H-VW-M representative—you can be confident that you'll get top performance from your electrical equipment.



Manual Tap Switch Control

For both self-contained and remote controlled units. Remote control type incorporates tapped auto-transformer in control cubicle. In self-contained units these are located in basic cubicle. Provides 22 positions of voltage adjustment from zero to rated voltage.



Motor Operated Tap Switch Control

For simple pushbutton control of output from remote location. Used in conjunction with tapped auto-transformer. A small remote control box can be mounted on side of tank or other convenient place. Meters, pilot light, raise-lower and start-stop pushbuttons also on small remote cubicle.

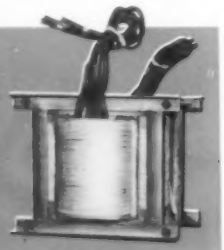
Continuously Variable Auto-Transformer

Either manual for small rectifiers or oil immersed, motor driven for larger ratings. This is the best method of voltage control since full stepless control of output voltage can be obtained from zero to rated voltage. It also achieves highest efficiency.

A raise-lower pushbutton as on motor operated tap switch control provides control.

Saturable Core Reactor

Wholly electrical in operation with no moving parts gives smooth voltage control from 10% to 100% of rated voltage providing minimum of 10% current load is drawn. Rheostat mounted on small remote control cubicle providing manual adjustment.



Automatic Voltage Stabilization

Where close regulation of DC voltage is desired to compensate for wide load changes in tank without adjusting voltage manually, a special device will automatically maintain voltage at pre-set amount. Either a voltage sensing panel in conjunction with a motor driven, oil immersed, continuously variable auto-transformer is used, or a special magnetic amplifier in connection with a saturable core reactor. Automatic constant current can also be provided.

Automatic Programming

Where different voltages are desired for special plating applications, an automatic programmer using a system of timers and controls will set the output at one voltage; operate at that voltage for pre-set time; change to another voltage at a pre-set rate; operate at new voltage for a certain time and then shut the rectifier off. There are also more simplified versions. Method of control is motor-operated continuously variable auto-transformer.

APPLICATION SUGGESTIONS

Use	Recommended Control
Batch Tank Plating	Manual tap switch.
Batch Tank Plating with wide load variations and high production	Motor operated variable auto-transformer, or motor operated tap switch.
Barrel Plating	Manual tap switch. No control rectifier.
Cleaning & Pickling	Manual tap switch. No control rectifier.
Conveyor—many stations	Manual tap switch (remote control). Motor operated tap switch. Saturable core reactor. Motor operated continuously variable auto-transformer.
Conveyor—few stations	Automatic voltage stabilization with variable auto-transformer. Automatic voltage stabilization with saturable core reactor.

Use	Recommended Control
Chrome Strike in combination with Plate Sulphuric Anodizing	Automatic programming with variable auto-transformer or special series hook-up. Manual tap switch. Motor operated tap switch. Saturable core reactor.
Color Anodizing	Automatic constant current with variable auto-transformer. Automatic constant current with magnetic amplifier and saturable core reactor.
Chromic Anodizing	Automatic programming with variable auto-transformer. Combination automatic constant current and automatic voltage stabilization with variable auto-transformer or saturable core reactor.
Electrolytic Metal Refining	Automatic current control with saturable core reactor.

H-VW-M

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.

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slightest murmur of electrical transformers and motors will make the "noise library" one of the most unique such collections in existence. The recordings will be used to compare various noises, so that noise sources can be isolated and corrected.

Plans were announced for a multi-million dollar addition to the new **DuPont** plant now under construction near Antioch, Calif. The new unit will manufacture sodium, ethyl chloride, trichlorethylene, and perchlorethylene.

METAL PRICES

ALUMINUM—(99% pure plus ingot)	24.40¢
BRASS—(Add $.0025 for less than carload lots)	
85-5-5-5 (Ingot $.115)	44.00¢
80-10-10 (Ingot $.305)	47.75¢
88-10-2 (Ingot $.210)	60.75¢
Manganese Bronze ($.421)	39.25¢
CADMIUM—Platers' shapes	$1.70
CHROMIUM—Electrolytic (99.8%) 0.2 Fe; ton	$1.27
COPPER—Electrolytic, domestic	46.00¢
Custom Smelters' Price	53.50-54.00¢
Refiners' Cu Scrap ($.1)	46.50¢
INDIUM—(Per Troy oz, commercial 99.97%)	$2.25
IRON—Pig (per gross ton—2,240 lbs)	$54.50-62.00
Scrap	$38.00
LEAD—(Common) New York	16.00¢
St. Louis	15.80¢
MAGNESIUM—(Ingot F.O.B. Newark)	34.70¢
(Sticks 1.3 in diameter, 100 lbs or more)	53.00¢
MERCURY—(Per 76 lb small quantities)	$264.00-267.00
NICKEL—Electrolytic Cathodes (sheets loose)	64.50¢
Spot price. Grade F ingots and shot New York 10,000 lb lots	66.92¢
PLATINUM—Refined (per oz)	$97.00-107.00
RHODIUM	$120.00-125.00
SILVER—New York (per oz)	91.125¢
U. S. Treasury price 1.000 fine. Buying price	90.50¢
Selling price, Government owned silver (F.O.B. San Francisco +1.25¢ transportation)	91.00¢
TIN—(Spot Delivery)	101.00¢
ZINC—Hygrade (delivered)	14.85¢
Special Hygrade (delivered)	15.25¢
Die casting alloys	18.00-19.00¢

Revised specifications and tests for electrodeposited metallic coatings Free, (through the courtesy International Nickel Co.)

STANDARDS RELATING TO ELECTRODEPOSITED METALLIC COATINGS

A 164 – 55.	Spec. for Electrodeposited Coatings of Zinc on Steel
A 165 – 55.	Spec. for Electrodeposited Coatings of Cadmium on Steel
A 166 – 55 T.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Steel (Tentative)
A 219 – 54.	Methods of Test for Local Thickness of Electrodeposited Coatings
B 117 – 54 T.	Method of Salt Spray (Fog) Testing (Tentative)
B 141 – 55.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Copper and Copper-Base Alloys
B 142 – 55.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Zinc and Zinc-Base Alloys
B 177 – 55.	Rec. Practice for Chromium Plating on Steel for Engineering Use
B 183 – 49.	Rec. Practice for Preparation of Low-Carbon Steel for Electroplating
B 200 – 55 T.	Spec. for Electrodeposited Coatings of Lead on Steel (Tentative)
B 201 – 55 T.	Spec. for Chromate Finishes on Electrodeposited Zinc, Hot-Dipped Galvanized, and Zinc Die-Cast Surfaces (Tentative)
B 242 – 54.	Rec. Practice for Preparation of High-Carbon Steel for Electroplating
B 252 – 53.	Rec. Practice for Preparation of Zinc-Base Die Castings for Electroplating
B 253 – 53.	Rec. Practice for Preparation of and Electroplating on Aluminum Alloys
B 254 – 53.	Rec. Practice for Preparation of and Electroplating on Stainless Steel
B 281 – 53 T.	Rec. Practice for Preparation of Copper and Copper-Base Alloys for Electroplating (Tentative)
B 287 – 54 T.	Method of Acetic Acid-Salt Spray (Fog) Testing (Tentative)

Sponsored by ASTM and AES and revised to September, 1955

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REPORTS FROM ALL OVER . . . STRIPPED, CLEA

Soft spots in the economy are not spreading. There is, as yet, no sign that business activity is going to fall off its current high plateau. Inventory figures lag by several weeks, but the evidence of January figures supports the view of more bank credit tied up in goods. The inventory rise in January for manufacturing and trade firms was $5.6 billion or circa 7 per cent.

Over $5.5 billion will be spent on industrial research in 1956, according to *E. Reeves*, **Esso Res. & Engrg. Co.**, who held that industrial research is no longer like the frosting on a cake, but is a critical element in the diet of many firms and industries. He warned against succumbing to the temptation of concentrating on problems needing immediate solution at the expense of those which must be solved in the future. Basic research must be continued vigorously.

The golden torpedo filter-dryer by **Imperial Brass Mfg. Co.**, Chicago, features a 2-stage drying action involving use of silica gel in both chambers plus a new Impernyl nylon filter. . . . Deep-well disposal of chemical wastes (as practiced by **DuPont** at its Victoria, Texas plant which makes adiponitrile) assures adequate disposal through subsurface disposal through injection wells. . . . Tinning cast iron—the direct chloride method now is generally applicable to gray cast irons, and has been used successfully for meehanite and spheroidal graphite irons. It is especially useful for articles of very varying sections where, with the fused chloride method, overtreatment of the thinner sections always is difficult unless preheating is used. This direct chloride method requires careful and complete grit blasting of every portion of the surface to be tinned.

A new, light-weight, rigid-type, reinforced, resinoid-bonded abrasive wheel (Simex Red Wheel) was advertised by **Simonds Abrasive Co.** as being structurally different for extra strength, extra safety. The spiral safety web backing is of auto tire cord construction. . . . Resin-bonded reinforced abrasive products increase bursting speeds by 35–160 per cent; impact strengths by a factor of 1⅔ to almost 14, and flexural strengths 2–7 times. Glass results in highest bursting speeds, nylon offers the highest impact and glass promotes the greatest rigidity. . . . US producing capacity for all polyethylenes in 1960 is placed at 830 million pounds, of which 585 million will be high-pressure and 245 million low-pressure resin according to *M. Stringfellow*, **Spencer Chem. Co.** Use of polyethylene in pipe shows a 10-fold increase between 1952 and 1960, or to around 100 million pounds in 1960. . . . Hot-dipped aluminum clad steel wire, now being produced at a

new **US Steel unit** in Cleveland, i
to most types of atmospheric corr
. . . Applying accelerated mangar
steel via standard spraying equipm
Co., England, to form tightly adhe
nese—iron phosphates. The resul
ators, etc., are said to be "far in adv
at present. . . . Ultrasonic machi
manium, silicon, ferrites, etc.) at hi
cutting tools are rugged and usua
tools to the machine is simple; high
possible. . . . A process for depositin
num (and other light alloys), with
undercoat of a second metal, was
London. . . . The molecular filter,
Biochem. Co., was advertised by **E.**
ordinary pressure filtration metho
molecules directly from solution at
tion models are available up to 10-
experimental lab use for instantane
samples, was introduced by **Erdc**
automatic, it features a patented el
which compensates automatically f
erties of the heated material durir

New adhesive uses are expected
methods developed at **Franklin**
FM-47, a vinyl phenolic adhesive
Co., Chester, Pa., bond strengths
psi between titanium surfaces, 4,00
for aluminum and 7,000 psi for stai
trick is degreasing, followed by a su
treatment and extensive rinsing.
for max joint strength of other met

New Rotobelt Filter developed at
vacuum drum type filter modified by
belt as the actual filtering medium.
give easy discharge of material.
wire is woven so close as to prevent
through the cloth freely. For a giv
ture is said to be lower than that ob

A library of noise will be one o
sound analysis laboratory recently
Electric Company at Fort Wayne

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corrosion than, for example, zinc.
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quipment is claimed by **Jenolizing**
adherent coatings of crystal manga-
resultant finishes on cars, refriger-
in advance" of those being obtained
achining of brittle materials (ger-
at high speed by impact grinding—
usually inexpensive; attaching the
high precision and many shapes are
ositing chromium directly on alumi-
without first having to put on an
, was announced by **Fescol Ltd.,**
filter, invented by *C. Hickey,* Int'l
by **E. Greiner Co.,** N. Y., as using
ethods to separate large and small
on at 250 ml/hr of water. Produc-
to 10-gph. . . . A dielectric oven for
ntaneous drying of solid and liquid
Erdco Engrg. Corp., Ill. Fully
ted electronic load matching system
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during the heating cycle.
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klin Inst., Philadelphia. Using
nesive by **Bloomingdale Rubber**
gths were obtained exceeding 7,000
4,000 psi for magnesium, 5,500 psi
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y a sulfuric acid-sodium dichromate
ing. Surface treatments are given
r metals.
ped at **Eimco Corp.** is a continuous
ied by adding an endless metal cloth
lium. It is said to be rugged and to
rial. The Type-316 stainless steel
event passage of light, yet air moves
r a given sewage sludge, cake mois-
hat obtained with a good cloth filter.
one of the major results of a new
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Wayne, Indiana. Recordings of the

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Lead-Tin-Antimony Plating
Electrotinning of Copper Wire from the Stannous Fluoborate Bath
Using the Interference Microscope for Thickness Measurements of Decorative Chromium Plating
Practical Methods for Treatment of Metal Finishing Wastes
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Metal Cleaning Studies Using Radioactive Tagged Soils
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Solids-Liquid Separation in the Treatment of Metal Finishing Wastes
The Five Per cent Salt Spray and Its Acetic Acid Modification
Electrophoretic Deposition of Metallic and Composite Coatings
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The Effect of Different Chromium Deposits on the Fatigue Strength of Hardened Steel
The Treatment of Certain Plating Solutions by Ion Exchange
Electroless Nickel Plating of Nonconductors
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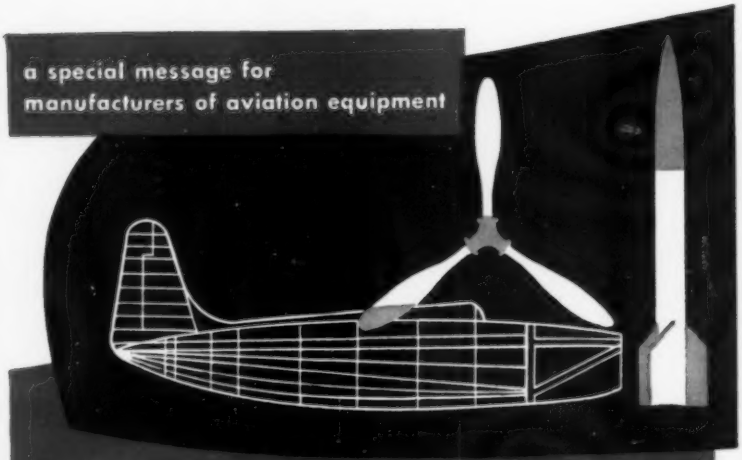

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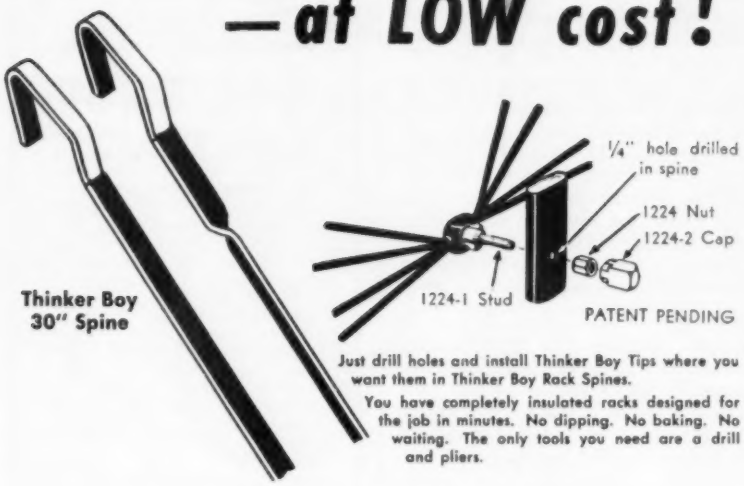

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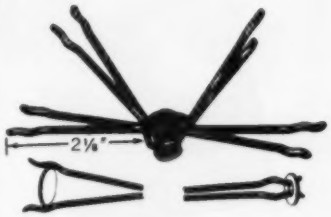
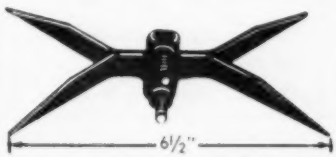
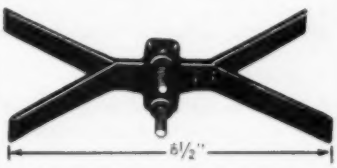


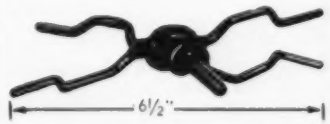
RS-207. Same design as the popular Style 1 Utility Tip. Has 8 prongs arranged in 4 pairs—formed to hold objects under spring tension from either inside or outside. Wire sizes: 1/16", .072" and .080". Universal Plastic Coated.



FS-102. Same design as the Style 4 Utility Tip, except has double knurler. 1/16" x 5/8" phosphor bronze. Universal Plastic Coated.



FS-101. Same design as Style 3 Utility Tip, except has double knurler. Excellent for racking objects that tend to wobble. Square ends are easily shaped when necessary. 1/16"x5/8" phosphor bronze. Universal Plastic Coated.



RS-201. Same as Style 2 Utility Tip. Wire sizes: 1/16", 3/32", .114" and 1/8". Universal Plastic Coated.

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TRADE-LITERATURE

L—406. Blast Cleaning Grit—Wheelabrator Corporation, Mishawaka, Ind., has published literature about its new steel grit blast cleaning abrasive. This abrasive, called Steeletts, is intended for producing etched finishes on metal:

(1) Providing a deep etch on metallic surfaces for bonding. Coatings of enamel, paint, glass, rubber, plastics, plating, and metallizing readily cling to the etched surface. (2) Providing lustre on nonferrous work by exposing virgin metal and giving it a matte-type surface. (3) Descaling alloy forgings and heat treated work. (4) Etching steel mill rolls. High hardness and great impact penetrate, giving a deep, long lasting etch.

L—407. Belting—Now available upon request, is a completely new fibre-board bound DANDUX Belting catalog. This catalog is unique in that the first section lists the belts by their uses; then there is an individual section for each specific belt.

L—408. Potassium Cyanide Solution—A new 4-page bulletin, describing Koppers Potassium Cyanide Solution for use in electroplating applications, has been issued by the Chemical Division of Koppers Company, Inc. Specifically, the product is presented in the light of its economy, purity, ease of handling, safety, and quality control.

Designed to be of information to small, as well as large, plating operators, the new bulletin lists the applications of the product to the plating of automotive parts, appliances, silverware, surgical instruments, hardware, tools, and ball bearings, and certain custom plating operations.

L—409. Chemicals Folder—The Victor Chemical Works of Chicago offer their Victafile. In it are to be found three reprints of articles on electropolishing and some twenty-two information bulletins, charts, bibliography, etc. The four-color folder covers all the chemicals offered by Victor for metal finishing and rustproofing.

L—410. Black as the Proverbial Ace—Swift Industrial Chemical Co. of Canton, Conn. publishes a bulletin (S-26-2) which gives full instructions on metal blackening in accordance with their "activanium blending" process.

L—411. All Angles—The Automatic Buffing Machine Co. of Buffalo, N. Y. offers a catalogue of its automatic and semi-automatic machines. Featured are set-ups for many of its machines together with diagrams of the machines as well as angular applications of work. These machines are for buffing, polishing, deburring, wire brushing and abrasive belt grinding.

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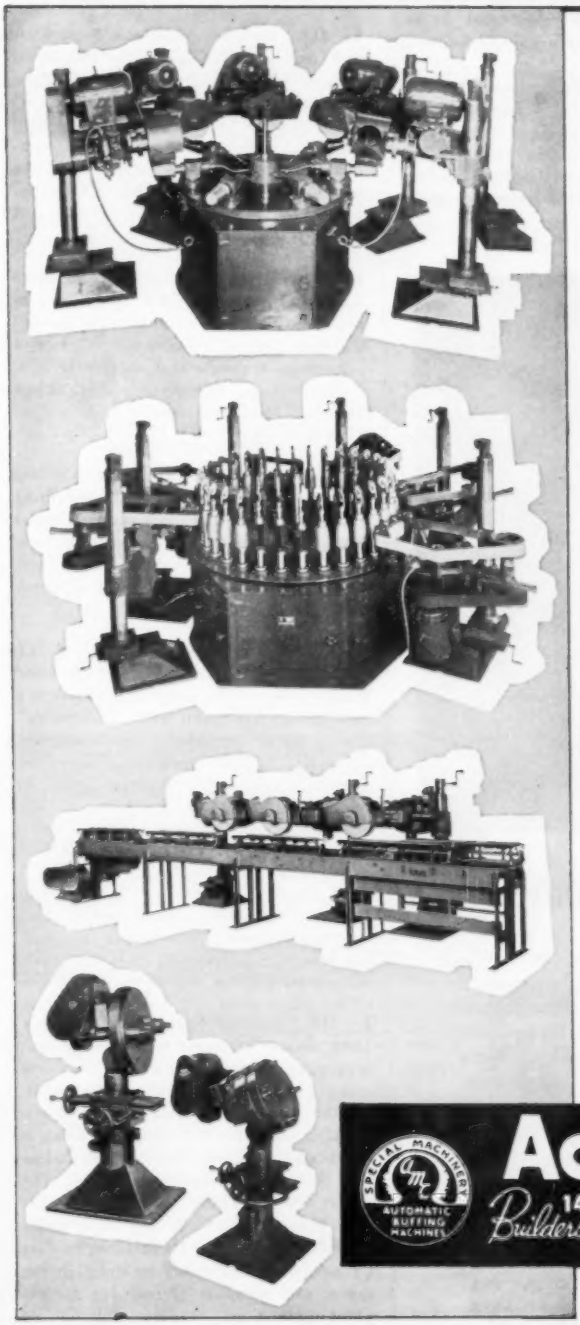

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• We will be pleased to receive blue prints or preferably finished and unfinished samples of the part you contemplate finishing together with detailed information on present finishing operation and production requirements. On receipt of samples and data we will offer recommendations and quotations.

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CATALOGS ON REQUEST

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L—412. Bulletins on Molybdenum Silicides—Two new companion publications on molybdenum silicides have just been issued by Climax Molybdenum Company, New York, N. Y. 1. Bulletin Cdb-6, an 8-page bulletin entitled "Refractory Molybdenum Silicides." 2. Bulletin CH-23, a 2-page bulletin entitled "Fabrication of Molybdenum Disilicide Parts."

In Refractory Molybdenum Silicides, complete information on the various molybdenum silicides is consolidated from 52 reference sources. This includes preparation, applications, and chemical, physical and mechanical properties of this new class of refractory compounds. In addition, multisilicide systems—e.g., chromium silicide-molybdenum silicide systems; titanium silicide-molybdenum silicide systems; etc.—are covered.

These molybdenum silicide compounds are characterized by outstanding resistance to oxidation and corrosion and superior stress-rupture strength at high temperatures. Of the various stable silicides, the disilicide ($MoSi_2$) seems to be the most interesting. It is unaffected by most inorganic acids including aqua regia; resists oxidation up to 1700 C; and at 980 C has a 100-hour stress-rupture strength superior to cemented carbides, cast and forged alloys, cermets and unalloyed molybdenum metal.

The other stable molybdenum silicides are Mo_5Si and Mo_5Si_3. A fourth silicide, Mo_3Si_2, is found if a small amount of carbon is present.

Applications for molybdenum silicides covered in the bulletin include: heating elements, gas-turbine blades and nozzles, refractory cermets, vapor-deposited coatings and protective coatings for graphite.

The various techniques used to make molybdenum disilicide parts are detailed in the supplemental bulletin on fabrication. Those covered include sintering and cold pressing, casting, vapor deposition and hot pressing. The latter, which appears to be the most widely used, is best for fabricating dense bodies. There are 21 references to sources of more complete information.

L—413. Delpark Magnetic Separator—A new technical sheet is available on Delpark's new principle of magnetic separation. The new separator uses a flat magnetic field instead of the conventional drum normally used by magnetic separators. The liquid flow is on top of the magnets and gravity action assists the magnets in attracting ferrous particles and sludge from the liquids.

L—414. Adhesives, Coatings, Sealers—A new 12-page, two-color, 8½ by 11 in profusely illustrated catalog listing properties and applications of a wide variety of adhesives, coatings and sealers is now available from Adhesives and Coatings Division, Minnesota Mining & Mfg. Co., Detroit, Mich.

L—415. Seamless Cans—A new, illustrated, 3-color, 4-page bulletin describing the wide variety of Ellisco seamless metal cans for pharmaceutical, laboratory, production line and packaging use, is now available from George D. Ellis & Sons, Inc., Philadelphia, Pa.

L—416. Instruments—Bulletin A-103 is a completely descriptive three-color double sided flyer featuring Simpson's new Model 458 seven inch "Colorscope" and on the reverse side Simpson's new 434 "Varidot" Whitedot Generator. The flyer contains pictures of these instruments along with specifications and information concerning proper usage of these testers.

L—417. Fractional hp dc Motors—A new 12-page publication on fractional horsepower direct-current motors and equipment has been announced as available from the General Electric Company, Schenectady, N. Y.

L—418. Rubber Roll Covering—How thick should a rubber roll covering be?, a primary consideration of mill engineers and machine designers in the textile, paper, plastics, rubber, metalworking, woodworking and other roll-using industries, is discussed in Rodney Hunt's latest Industrial Roll Engineering Report No. 8. The report, "How Thick Should A Rubber Roll Covering Be?" is one of a series published by Rodney Hunt Machine Co., Orange, Mass., intended to assist in the design and selection of rolls for specific plant applications.

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it's the finish that counts!

Roto-Finish maintains exact tolerances on precision parts with no significant dimensional changes. It makes possible a wide range of finishes applicable to parts of almost any size or shape; finishes a variety of materials — at big savings in manpower and costs. Without obligation, send sample unfinished parts to us. Include finished part for guide and your specifications. Roto-Finish will finish parts in its laboratory. You get a complete process report. You are guaranteed results and a finish that counts!

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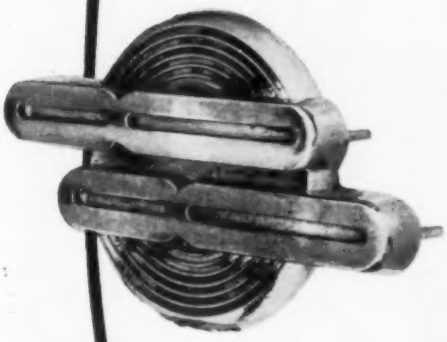
NOW *remove all buffing compounds with* ONE WATER DIP*



BEFORE cleaning, parts are covered with buffing compounds, especially buff lap. In some spots, hard-to-get-at recesses have been almost completely filled with buffing compound.

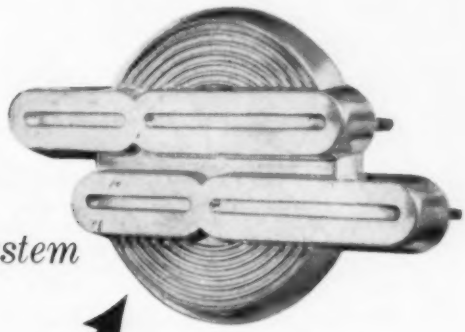
Here at last is a *water phase cleaner* that solves a major plating problem — buffing compound removal — quickly, thoroughly, easily.

SAVES STEPS — Simplify cleaning and speed up your plating operation with this brand new soak cleaner that quickly and thoroughly removes all buffing compounds, especially buff laps, with just one cleaner bath.

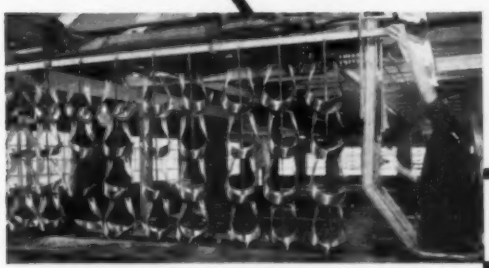
ELIMINATES REJECTS — the HAVASOL O/SC-1 System does a *complete* job, cleans all recesses, yet leaves no difficult-to-remove emulsion or oils to contaminate plating solution. It's completely water soluble, is not a serious contaminant, presents no waste disposal problem. Won't attack rack coating.

SAVES TIME — Cleaning action takes only 30 seconds to 5 minutes, depending on type of compound. Fast enough to be easily adapted to automatic or manual plating cycles. Eliminates vapor degreasing. It's non-toxic, odorless, and has excellent life.

**using* HAVASOL O/SC-1 *system*



AFTER only 30 seconds to 5 minutes exposure to HAVASOL O/SC-1 System, all buffing compounds have been removed — parts are spray rinsed and ready for electro-cleaning.



Preston Products Co., Grand Rapids, Michigan, quality production platers, finds HAVASOL O/SC-1 System cuts cleaning costs, adds to plating profits by doing a faster, better cleaning job — with only one bath and spray rinse.

For electrolytic cleaning — Haviland Electrolytic Cleaner 15 is an all-purpose, medium duty cleaner with high chrome tolerance, high conductivity, and extra long life, even in hard water. Safe for use on steel, zinc, copper, brass. Especially useful after Havasol O/SC-1 Soak Cleaner.

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Firm_____

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City_____ State_____

L—419. Power Tools—Skil Corporation's 1956 catalog of industrial portable power tools, listing more than 100 models and accessories, is now in the hands of distributors, with price schedules.

L—420. Ion Exchange—Interest has focused, recently, on the application of ion exchange to the treatment of certain plating solutions.

Solutions used in various electroplating operations are expensive, toxic, sensitive to impurities and create disposal problems. In many cases, ion exchange resins can be used to purify and recover chemicals such as chromic acid. Disposal of toxic wastes can be alleviated by proper use of ion exchange. Such treatments are both practical and economical.

Literature on the subject is currently being offered by National Aluminate Corporation. It describes treatment and recovery techniques for anodizing and chromium plating solutions. Still and running rinse solutions are deionized and recovered.

L—421. How to Strip Paint—Paint removal by the application of alkaline or solvent materials is the subject of a recently revised booklet "How to Strip Paint," published by Oakite Products, Inc., manufacturers of industrial cleaning and related materials.

The booklet describes the procedures followed in four different stripping methods—steam gun, hot flow-on, cold spray and tank. It tells which materials should be used for specific types of paint, enamel, and lacquer. The booklet also discusses ways to protect stripped parts from rust in storage and how to prepare them for repainting to prevent future rusting.

L—422. PVC Linings—How to choose the best polyvinyl chloride protection for any given corrosive environment is discussed at length in a new booklet available from Kaykor Industries, Inc., Yardville, New Jersey.

The three most commonly used types of PVC protection are covered individually, attention being paid to physical and chemical characteristics, advantages and disadvantages and the applications for which each is best suited. In addition to unplasticized polyvinyl chloride structural material, and flexible PVC lining, space is devoted to the recently introduced flexible-rigid polyvinyl chloride laminates, which combine the inertness of the unplasticized with the easy application of the flexible types.

Not intended as a substitute for the Engineering Bulletins which Kaykor also publishes, the booklet should do much to eliminate confusion as to the proper material for a job.

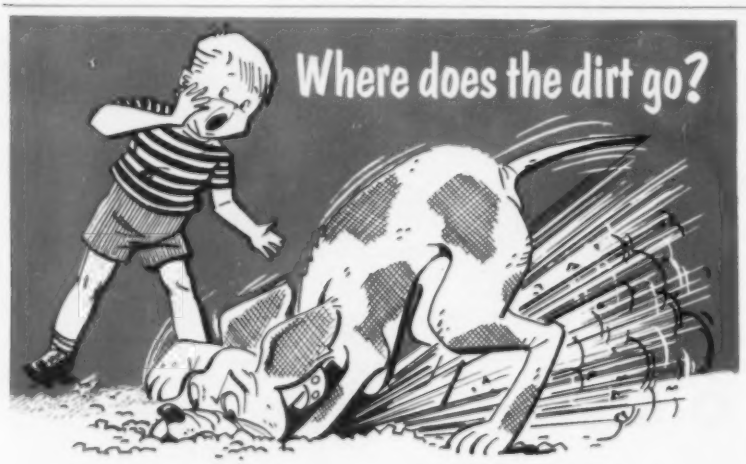
L—423. Review of Laboratory Apparatus—LANCO Apparatus Review No. 6, published by Arthur S. LaPine & Company, Chicago, Ill., describes and illustrates 1955's best sellers in the line of laboratory apparatus. A separate 4-page section introduces Harleco volumetric solution concentrates.

L—424. Iron Removal Article—A new, comprehensive article on iron and manganese removal from water supplies is now available from Graver Water Conditioning Co., New York, N..Y. Technical Reprint T-144 discusses this troublesome problem being encountered more and more each day by industry and municipalities alike.

Although iron has many useful purposes, it is a constant source of trouble to water supply engineers. In certain industries, the slightest trace of iron in the water causes inferior products, excessive rejects or a score of other problems. Municipalities find that not only do the inhabitants find the presence of iron objectionable, but industry tends not to settle in areas where public supplies have an iron problem.

This article presents details and actual engineering layouts of seven different types of iron removal systems. Since iron can be found in many different forms in a water supply, there is no one solution. As pointed out in this paper, each case must be individually considered. The seven methods discussed can handle any type of problem encountered. Several actual case histories are discussed, the problems analyzed and the results presented. Flow sheets of these plants are also included.

L—425. Humidity Recorders—A new six-page two-color bulletin describing and illustrating the company's line of portable recorders for relative humidity and temperature has been released by The Bristol Company of Waterbury, Conn.



It's still around, Sonny, but you can't see it. It's broken up too fine.

That's the way it is with oil, grease, drawing compounds, stamping compounds, and other soils removed from metal parts in a tank of . . .

Cowles NS SOAK CLEANER

No Scum on the cleaning tank to foul cleaned metal coming out. Clean it with Cowles NS Soak Cleaner and it *stays* clean.

For more information about the emulsifying power of Cowles NS Soak Cleaner for *soak-tank* cleaning before plating, enameling, other finishing . . .

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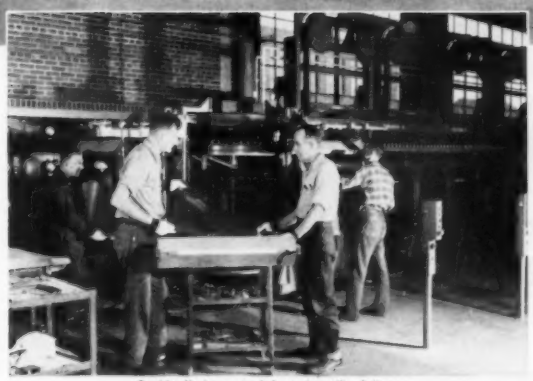
See Cowles FE and QC advertisements on pages 464 and 480.



"Racking" of can stock for automatic plating.

Control operator monitoring plating operation at rinse stage.

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For the first time this exclusive installation makes possible the testing of new plating processes and metallic coatings under conditions similar to those in actual plating plants. Fully automatic, this precision-controlled plating line can produce metal-coated test panels in large numbers with positive accuracy for forecasting results obtainable with any experimental or plating method.

Extreme flexibility is an outstanding feature. Thirteen different stations make possible cycle combinations from 1 to 13 stations with times of 5 seconds to several hours, even days, in any station. Also provides either single or double line operation for work up to 3 feet in cross section. Tanks can be simply moved in any sequence with a lift truck. A panel board controls time, current and voltage for each stage of a cycle. Power is supplied by a bank of 6 rectifiers, each rated 1000 amps at 12 volts, 2000 amps at 6 volts. Although designed for full automation, the line can be operated manually.

Again Lasalco demonstrates superior ability to find the *right* answer to *any* plating problem. Make it a rule to *always consult Lasalco first!*

Photos courtesy International Nickel Co., Inc.

HOME OFFICE
2820 LaSalle St.
St. Louis 4, Mo.
PRospect 1-2990

LASALCO, INC.
EQUIPMENT, CHEMICALS AND SUPPLIES FOR
ELECTROPLATING, ANODIZING AND POLISHING

IN TEXAS
1113 Perry Road
Irving (Dallas), Tex.
BLackburn 3-4921

L—426. Plug-in Busway—A factory-assembled plug-in busway system permitting direct connection to bus bars for feeding lighting and power loads in industrial plants, schools, offices, commercial, and public buildings is described in a new 20-page, two-color bulletin issued by the Distribution Assemblies Department of the General Electric Company.

L—427. Control Center—A compactly designed general-purpose motor control center which permits savings of up to 50 per cent in floor area is described in a new 24-page, two-color bulletin released here by the Distribution Assemblies Department of the General Electric Company.

L—428. Vanton Pump to Market Stainless Fittings—Cooper Alloy patented Quikupl® stainless steel fittings are to be sold and serviced by Vanton Pump & Equipment Corp., Hillside, N. J. In making this announcement, sales manager Gerald Lewis, stated that all correspondence and sales will be integrated through the Vanton network of representatives located in all major industrial cities.

L—429. Chemical Resistance Chart—The largest, most comprehensive list showing compatibility or non-compatibility of reagents to such thermoplastic materials as polyethylene, nonplasticized polyvinyl chloride, high impact polyvinyl chloride, and high tensile high temperature polyethylene, has been developed in booklet form by the American Agile Corporation, Maple Heights (Cleveland) Ohio.

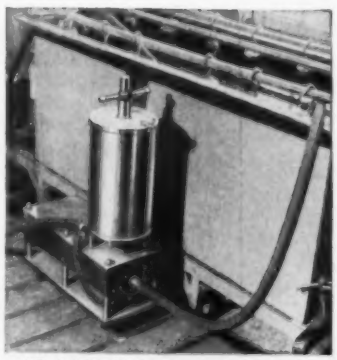
LOOK

No Rejects

NO pitting, spotting, or reworking . . . . . .

Impurities—primary cause of pitting, spotting, rejected finished work—are positively eliminated by the Alsop "Sealed-Disc" Filter. That's because they're designed for Platers—to meet plating room requirements. That's why they're compact, portable—smaller than conventional filters—save valuable space—yet capable of handling equal volumes of solutions.

Simplicity of design cuts operating time and labor—means savings for you. Check its many additional proved performance features and know why more platers depend on "Sealed-Disc" Filters. Ask your regular plating supplier—or write for details.



"Sealed-Disc" Filters remove more impurities with less effort and in less time. Use it on your acid dips, electro cleaners, and solvents too.

ALSOP ENGINEERING CORPORATION

Positive Filtration

FIRST STEP IN CUTTING COSTS

1104 FINE STREET • MILLDALE, CONNECTICUT

L—430. Removal of Paint and Phosphate Coatings—The removal of stubborn paint and phosphate deposits by the use of Oakite Rustripper is described in a newly revised folder recently published by Oakite Products, Inc., manufacturers of industrial cleaning and metal treating materials.

The folder graphically shows how the use of this new alkaline rust, paint, and oxide scale remover can eliminate separate rinsing, pickling, and neutralizing operations on rejects, products that may have rusted during production and used products that are to be reconditioned. This reduction on the production line, according to the manufacturers, means savings in time, space, power and materials.

L—431. Burnisher and Dryer—A new portable type Mercil Burnishing Barrel and a new Mercil No. 1 Dryer are described in a two-page bulletin offered by Hanson-Van Winkle-Munning Co., Matawan, N. J.

The advanced design of this new burnisher plus its portability make it particularly applicable to jewelry polishing and deburring and cutting down of other materials. A photograph of the portable Mercil Burnishing Barrel illustrates the text.

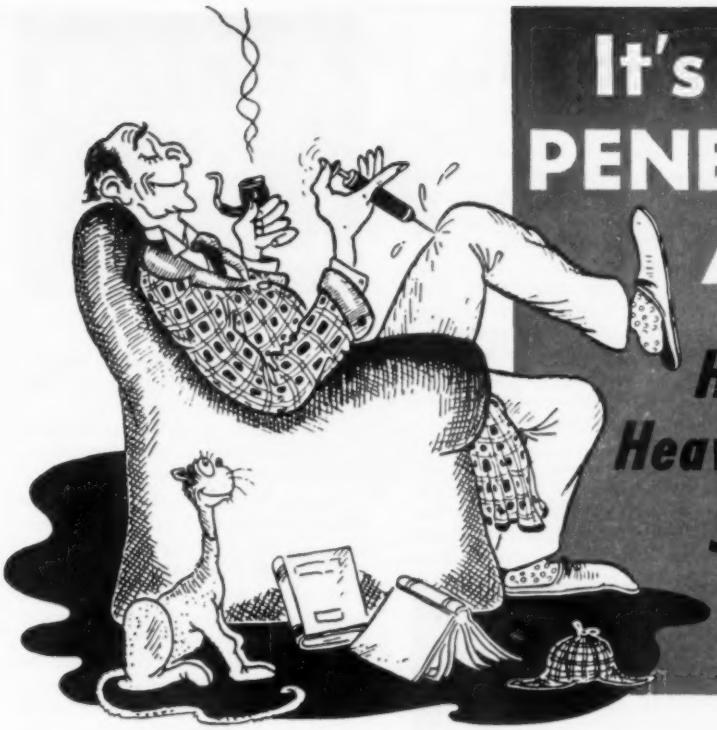
Low cost, compactness and sound engineering with design simplicity are features of this new Mercil No. 1 dryer.

L—432. Measure the Alky—Alcohol and solvent users can now obtain charts for gauging the contents of 55-gallon drums at various temperatures, by stick measurements. These supersede similar 54-gallon drum charts distributed in the past, since U.S.I. and other producers have now switched to the newer drum-size.

L—433. Vapor Spray Degreaser—Literature describing the Circo OP2 vapor spray degreaser, a new basic model for metal cleaning operations available in various corrosion resistant combinations and with gas, electric or steam heating systems, is available from Circo Equipment Company, Clark, N. J.

Advantages enumerated include unobstructed tank walls, demand type water control, new leakproof stainless steel pumps, lower height, enlarged access doors, commodious built-in storage tank, extra large and deep water separator, decreased floor space requirements and removable, one-piece condensate coils.

L—434. Field Studies of Corrosion Proofing—A new brochure on corrosion proofing materials and techniques containing detailed information on cement mortars, interliners for masonry construction and protective coatings and linings for surface treatment is offered by the Pennsylvania Salt Manufacturing Company's Corrosion Engineering Department.



It's the PENETRATING ACTION!?

How AHCOLOID Heavy Duty Cleaners SOLVE the Toughest Soils

Sherlock Holmes knew a thing or two but he never dreamed of solving a case as fast as Ahcoloid Heavy Duty Cleaners solve cases of industrial soil! Drawing or stamping compounds, heavy oil or grease films, and industrial waxes come clean in no time when these fast-acting cleaners go to work. Whatever your cleaning problem, one of these cleaners is your best solution . . .

AHCOLOID CLEANER 202-A

This mild, low-pH soak cleaner is excellent for use on steel and most types of nonferrous metals, particularly to remove oily films with mineral oil base. Removes heavier oil films than most soak cleaners.

AHCOLOID CLEANER 202-B

Similar to 202-A but with higher alkalinity. Good to remove semi-solid, greasy, or waxy soils on steel and ferrous metals.

AHCOLOID CLEANER 213-B

This unique, low-pH soak cleaner is very mild . . . ideal on steel and stainless to remove drawing or stamping compounds and die lubricants with high metallic soap content . . . also drawing lubricants on phosphated surfaces.

AHCOLOID CLEANER 215

Economical soak cleaner for steel and nonferrous metals. Its low-foaming characteristic makes it ideal in tumbling equipment or for still tank processing. Many types of soil respond best to this cleaner.

Often cleaning problems arise from the unknown nature of the materials which cause the soil . . . why not submit your problem to our laboratory for testing and recommendations . . . without obligation.

22

CHECK AND MAIL TODAY

For more information about any of the above cleaners, check the appropriate box or boxes, clip, and mail to Apothecaries Hall Company, 22 Benedict Street, Waterbury, Connecticut.

202-A ☐ 213-B ☐

202-B ☐ 215 ☐

Apothecaries Hall Co.

Equipment and Supplies...

Hang it All

E—435. Overhead Clothes Storage—A new overhead lockerbasket, completely solving the changeroom problem for industrial plants has been announced by the Moore Company.

The new six hook Moore Lockerbasket raises clothing and personal effects to the ceiling, where they are stored in normally wasted space. The large basket holds shoes, helmet and personal effects, while the Clothes-Lok action coat hooks securely lock the employees clothing to the unit.

Use of the new six-hook Moore Lockerbasket allows a 50 per cent reduction in changeroom size, offers perfect security of the contents, and gives 100 per cent ventilation to the clothing.

In addition, Moore Lockerbaskets are designed so the management can check the contents of each Lockerbasket from the floor, without lowering the Lockerbasket.

Complete operating accessories are furnished with each Lockerbasket, including chain, pulleys, pulley supports and locking assembly.

E—436. Belt Grease—Kocour belt grease was developed by Kocour Co. as a polishing aid for abrasive belt operation on both ferrous and non-ferrous metals. This perfectly uniform compound is chemically controlled to insure good results. Its non-

Non-Loading

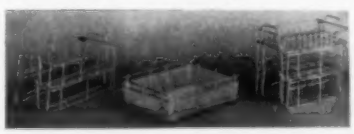
loading properties maintain a film on the abrasive surface thus preventing metal particles which normally adhere to cutting points from loading up the abrasive surface. This action minimizes dulling of abrasive grain on the belt thus maintaining a sharper cutting surface throughout the entire life of the belt. Belt life is usually increased in terms of more production units per belt. It will not clog the belt as in the case of some commonly used greases. Operation and maintenance is much cleaner, eliminating the necessity of stopping production to wash abrasive belts.

Kocour belt grease is available in paper tubes, 2½ inches x 8½ inches, each weighing approximately 1¼ pounds, and can be supplied in any quantity required.

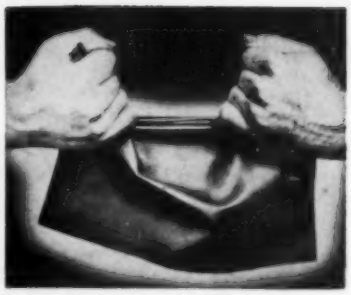
E—437. Wire Baskets—The Chas. Wm. Doepke Mfg. Co., Inc. has added wire baskets to its NesTier line of parts handling equipment. Standard sizes offered, range from 18 inches x 10 inches x 3 inches

They Nest

to 24 inches x 14 inches x 12 inches. In addition, facilities are available for fast, economical design and production of special baskets and inserts to meet individual requirements.



To insure proper annealing of welds, NesTier wire baskets are welded on special machines equipped with automatic controls. Regularly furnished in bright basic steel wire, they are also available in other materials, including stainless steel. A variety of wire sizes is offered, ranging from No. 16 to ½ inch. NesTier wire baskets can be supplied zinc plated or finished in a variety of plastic coatings. Either nesting or stacking designs are available, with fixed or movable handles.

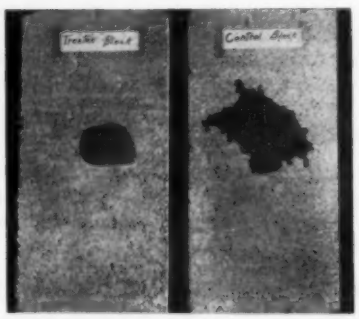


Miracle Fabric

E—438. Super Strong Coated Nylon—New Vinyl or Neoprene coated nylon "miracle fabrics" are now available from C. R. Daniels, Inc. for industrial maintenance use; such as, material and equipment covers, aprons, truck covers, etc.

Daniels, who also maintain their own mills, found that their nylon fabric, Dantex, is over five times as strong as the same weight of standard treated canvas.

In addition, these "miracle fabrics" are unaffected by oil, grease, most acids, and temperature extremes. They are easily sewn on conventional machines or may be cemented. They are completely waterproof (will actually hold and carry water) and may be made flame resistant. A wide range of brilliant colors, as well as white, aluminum, blue, olive drab, are now available for delivery, in all weights.



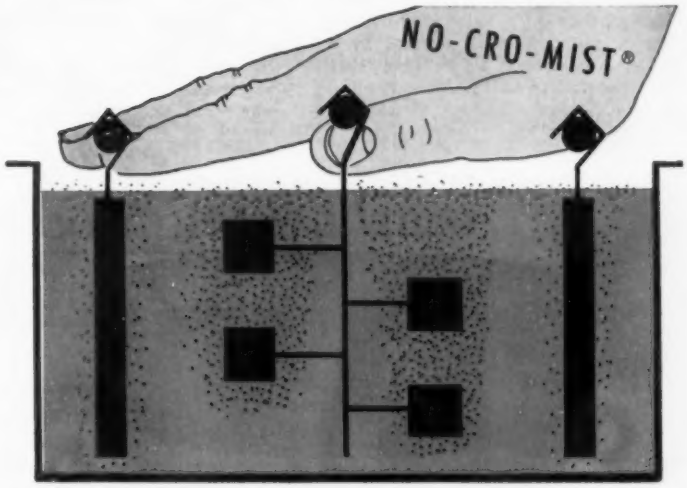
Moisture Proofer

E—439. H_2O Repellent—Addition of only 2 per cent to 4 per cent of "Losorb," the low-cost moisture-proofing additive, introduced by Pennsylvania Industrial Chemical Corp., Clairton, Pa., permanently decreases by about 50 per cent the permeability of concrete blocks, mortar, plaster, stucco and concrete. Losorb also minimizes crack frequency, makes the mix more plastic and easier working, acts as a lubricant in molding, minimizes shrinkage in curing and prevents stucco from drying and cracking before the concrete base cures thoroughly. Industrial steel supported on concrete treated with Losorb is permanently protected from corrosion by moisture absorbed from the earth.

Announcing . . .

SUPER NO-CRO-MIST®

(Your Invisible Hand for Suppressing Chrome Plating Spray)



GOES 50% FURTHER!

Super No-Cro-Mist gives unequaled mist-control of Chrome Plating Baths as regular No-Cro-Mist with ⅓ less amount of additive required.

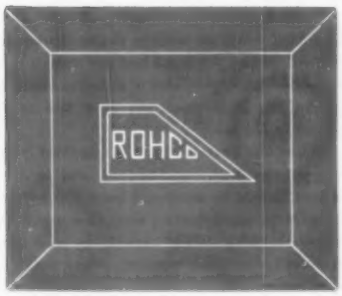
ROHCO® ADDITION AGENT PUMP

New type Vanton Pump operates automatically. Ideal for use with Super No-Cro-Mist and other plating bath additives.

Here's What No-Cro-Mist . . . . . WILL DO FOR YOU!

1. Eliminates up to 95% of normal chrome spray.
2. Case histories report markedly improved covering power—as much as 20% lower total current can be used.
3. Contains nothing that will harm the plating bath.
4. Greatly decreases dragout losses; helps solve rinsing and waste disposal problems.
5. Lowest in cost by far than any low-foam surface active agent. Pays for itself in savings!

R. O. HULL & COMPANY, Inc., 1302 Parsons Ct., Rocky River 16, Ohio



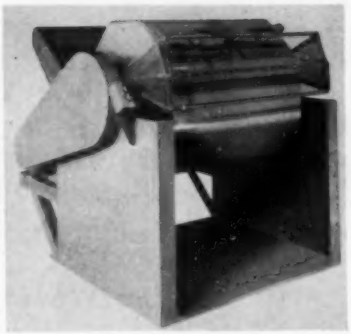
DISTRIBUTORS AND STOCK POINTS: CHICAGO, Ardco, Inc. • TORONTO CANADA, Armalite Company, Ltd. • LOS ANGELES-SAN FRANCISCO, Crown Chemical & Engineering Co. • ST. LOUIS, Davies Supply & Manufacturing Co. • NEW ENGLAND, NEW YORK, PENNSYLVANIA, Enthone, Inc. • MINNEAPOLIS, W. D. Forbes Co. • BINGHAMTON, Austin F. Fletcher, Inc. • OREGON, WASHINGTON, Great Western Chemical Company • DALLAS and DAYTON, R. O. Hull & Company, Inc. • DETROIT, George L. Nankervis Co.

"THE HULL CELL TEST MAKES PLATING BEST"

EQUIPMENT & SUPPLIES

E—440. Big Tumbling Barrels—The "Lorco 300" series of heavy-duty barrels is built for precision finishing of large-quantity loads weighing from 700 to 3,800 lb. The line includes six octagonal barrels, one and two compartments, ranging in total capacity from 6.9 to 36.6 cubic feet. Barrel diameters are 30 and 36 inches; barrel lengths run from 16 inches up to five feet.

These barrels are built to withstand long runs under severe operating conditions. Ruggedness, dependability, safety and ease of maintenance were the prime considerations in the design. The oversize Reeves motor drive is powered by a NEMA-type motor of 1½ to 7½ hp. Controls, manufactured by Allen Bradley, include forward, reverse, off and jog switches, arranged in a watertight mounting. A 24-hour timer is available as optional equipment.



Heavy Duty Barrel

Heavy-duty pillow blocks give trouble-free service. All lubrication points are easily accessible. Drum can be readily removed from the frame, and the drum height is arranged for easy inspection of the drum in any position. There are no overhead obstructions that can be damaged by a hoist pan, and no bulky end supports to get in the way of the operator.

A built-in transformer supplies 110 volts to the control switches. The reversing across-the-line starter is protected against overload. Screen guard is electrically interlocked to protect the operator; drum cannot be accidentally moved while the guard is open. On all two-compartment barrels, two separate screen doors are furnished in addition to the two watertight doors.

E—441. Fluidized Protection—The American Agile Corporation, Maple Heights, Ohio, has announced a modification of its fluidizing equipment to permit spraying of targets which cannot be accommodated by the basic dipping technique.

The new fluidized process of protective coating provides corrosion-resistant coatings of polyethylene, polyfluorocarbons, nylon and other plastics on metallic and dissimilar plastic molded targets.

Powdered Protection

Key to the fluidized process is a dual-purpose powder fluidizer, a compact unit consisting of a specially designed compressed air distribution system which maintains the plastic powder in a dense dry turbulent state.

Targets to be coated are preheated in a standard oven or with a flame, then immersed in the fluidized bed for only a few seconds. This provides a uniform coating up to 3/16 inch thick on even the most intricate shapes.

When the heated object is removed from the powder bed, the residual heat is usually sufficient to melt and level the adhering powder particles to a smooth nonporous resin cladding. The result is a tough adherent corrosion barrier, ready for immediate use.

meet our star salesman

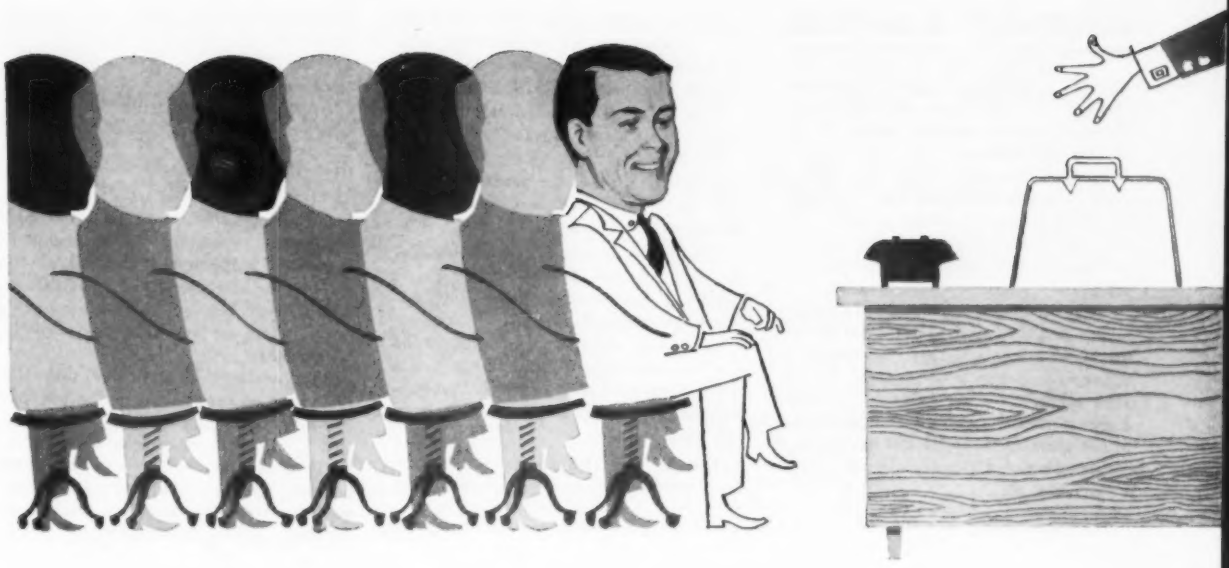
Our best "door-opener" and "contract-closer" is the product itself. On its merits it has built us a "blue chip" customer list.

Why not see for yourself how good BFC Chromic Acid really is by sending us an order to cover your next spot need?

BETTER FINISHES & COATINGS, INC.

268 Doremus Ave., Newark 5, N. J. • 2014 East 15th St., Los Angeles 21, Calif.

PAINTS · PLASTICS · CHEMICALS BFC



You can't complete a sale with a fraction of the buyer!

In industry, the "buyer" isn't a single individual. Even in a small plant, the buyer is likely to be a group of anywhere from three to a dozen or more men, and back of the men who participate directly in a buying decision are many others who are in a position to influence purchases. In many cases the salesman cannot meet all of the direct participants, and usually meets almost none of those behind the scenes. In effect, he sees only a fraction of the buyer.

One very important function of industrial advertising is to carry the story of product and company to the men whom the salesman cannot see.

These behind-the-scenes buying influences represent many different functions, interests, and points of view. One man may be concerned only with price, another with production, while still another may have the task of balancing benefits against cost or against possible benefit from the same expenditure for a totally different purpose. Some men will be concerned with evaluating your product in comparison with competing products, and their evaluation may include opinions from men in the shop who will be responsible for its operation, use or maintenance.

The only way to reach all of these men is by means of carefully-planned industrial advertising, utilizing all pertinent media and designed to bring to each person the type of information he needs for his part of the buying decision. Only when personal selling is "teamed up" with adequate advertising do you reach the *total* buyer.

National Industrial Advertisers Association, Inc.

271 Madison Avenue, New York 16, New York

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

EQUIPMENT & SUPPLIES

E—442. "U" Type Quartz Immersion Heater—The Glo-Quartz Electric Heater Company, Inc. is now presenting its line of new and exclusive "U" Type Quartz Immersion Heaters. This new electric radiant translucent fused quartz immersion heater was designed to solve the difficult problems encountered in the heating of acid electroplating and pickling solutions.

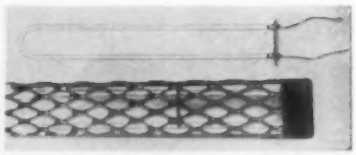
Exhaustive tests in many industries over a period of time have proved the remarkable advantages and economies of this revolutionary new heater. Among these advantages are: 1. Heats instantly. 2. 100 per cent short-proof construction. 3. 100 per cent Thermal and shock-proof construction. 4. Greater accuracy. 5. Longer life.

The manufacturer guarantees that the "U" Tube element will not burn out within a period of one year and should last several years under normal usage.

Greater accuracy in controlling bath temperatures is now possible with the new Glo-Quartz "U" Type Immersion Heater when used with a thermostat, because there is virtually no thermal lag between thermostat and heater.

This heater consists of two interchangeable components: The "U" shaped quartz heating element and the combined junction box and guard assembly. The resistance heating element is mounted inside the "U" shaped quartz tube and the coil is firmly supported with a special heat-conducting powder. Hermetic sealing locks out acid fumes.

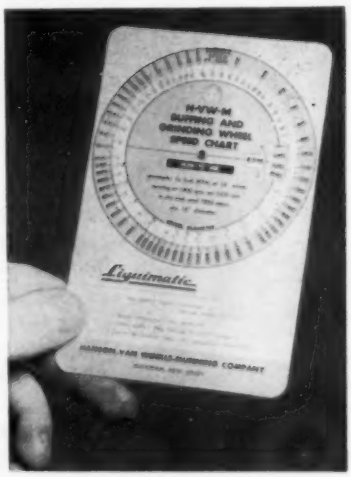
The "U" tube element rests, at the top, on a special neoprene gasket which absorbs mechanical shock off the guard, thus protecting the tube from damage when it is mounted in the tank. This is in contrast to conventional straight type quartz tubes which are anchored at the bottom to the guard, where mechanical shock is directly transmitted.



Fast, Short-proof, Shock-proof, Accurate, Long Lived Heater

More wattage is attainable with the "U" tube heater than with the conventional straight tube heaters because the two "U" tube elements are mounted parallel to each other. The new "U" type heaters are made in standard voltages and wattages and are available through leading electroplating distributors.

E—443. Wheel Speed Chart—A handy 3 x 5 inch disk chart for determining the surface speed of buffing and grinding wheels is now available from the Hanson-Van Winkle-Munning Company.

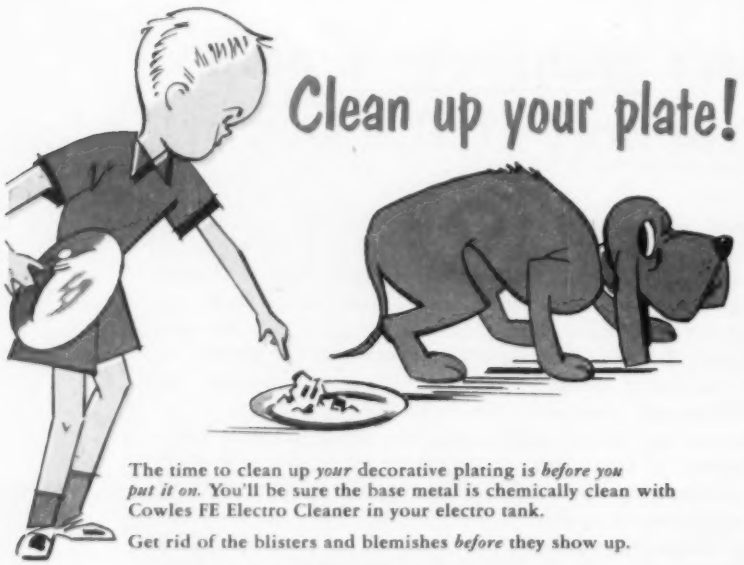


Spin It For Speed

Printed in two colors, the chart enables one quickly and easily to know the surface speed, in feet per minute, of any wheel from 1 to 60 inches in diameter, turning at spindle speeds of from 220 to 20,000 rpm.

E—444. Maskers—Two new all-purpose masking tapes now are available from the Permacel Tape Corporation, New Brunswick, N. J.

The new tapes, designated Permacel 708 and Permacel 718 utilize flat 30 lb kraft paper backings, specially processed and impregnated to give flexibility and internal stretch. The adhesive on both tapes is transparent, rubber based, pressure sensitive with special heat and stain resistant properties.



Clean up your plate!

The time to clean up *your* decorative plating is *before you put it on.* You'll be sure the base metal is chemically clean with Cowles FE Electro Cleaner in your electro tank.

Get rid of the blisters and blemishes *before* they show up.

Cowles FE Electro Cleaner

gets *all* of the soil because it *gets to* all of the soil. No crevice or corner escapes its soil-penetrating power.

GET THE FULL STORY ON HOW Cowles FE ELECTRO CLEANER penetrates soil (rapid wetting) dislodges soil (high current capacity) disperses soil (thorough emulsifying)

Ask your Cowles Technical Man—or send this coupon for Technical Bulletin about Cowles FE Electro Cleaner.

Cowles Chemical Company
7018 Euclid Avenue
Cleveland 3, Ohio
Please send Cowles FE Bulletin
Name_____
Company_____
Address_____
City_____ State_____

Cowles CHEMICAL COMPANY
CLEVELAND 3, OHIO

See Cowles NS and QC advertisements on pages 456 and 480.

For Your File! **IMPROVED PLATING TECHNIQUES**
By Baker & Adamson®

How You Can Make "Printed Circuits" Faster and Better Than Ever!

Use B&A Copper Fluoborate for High-Speed Electroforming—The time required for the copper plating of thick, high quality circuits is reduced sharply by high purity B&A Copper Fluoborate.

Get the Excellent Solderability Produced by B&A Lead-Tin Fluoborate—Assembly is expedited through the use of B&A Lead-Tin Fluoborate giving a 60:40 tin-lead deposit of maximum solderability.

FREE! **Technical Bulletins on the Production of Printed Circuits. Mail coupon for them today!**

REAGENTS
B&A
STANDARD OF PURITY
FINE CHEMICALS

BAKER & ADAMSON® *Fine Chemicals*

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

The trend throughout the electronics industries is to low-cost "printed circuits" . . . for radios, for television sets, for more and more types of products with electric circuits.

Now these economical circuits can be made better and faster than ever, your products improved, your costs lowered, with the use of B&A Fluoborates. These high purity plating solutions come in concentrated solution form, require no mixing or dissolving, give stability in bath composition and practically 100% anode and cathode efficiencies.

B&A technical bulletins describing these improved plating techniques are available on request. Send coupon for them today.

BAKER & ADAMSON PRODUCTS
General Chemical Division
Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.

Please send technical bulletins on the use of B&A Fluoborates in the production of printed circuits.

Name_____
Company_____
Title_____
Address_____
City_____ Zone____ State_____

Pl-4

EQUIPMENT & SUPPLIES

E—445. Rh Solution—A rhodium-plating solution designed specifically to produce heavier deposits with lower stress in a shorter space of time was announced by Baker & Co., Inc., Newark, N. J., a division of Engelhard Industries.

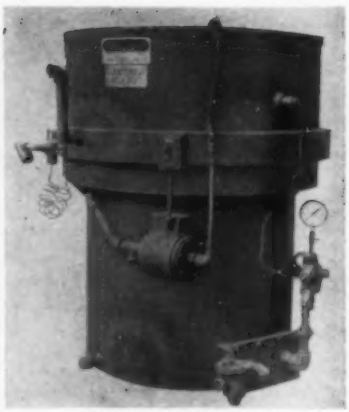
The special solution, known as Baker Rhodium Plating Solution No. 221, plates up to 0.001 inch in 70 minutes. It can be used without modification of present equipment.

While this bath is intended for producing specification deposits, it may be used with excellent results for decorative purposes, especially where plating speed is important.

The deposit produced from this bath is also extremely useful in many electrical and electronic applications. In general, rhodium protects against corrosion, and improves efficiency whenever a low-resistance, long wearing, oxide-free contact is required. Rhodium plate assures low noise level for moving contacts, no oxide rectification, low and stable contact resistance. Plated over nickel or silver, it provides highly efficient protection for printed circuits, lengthening the life of the circuit, and protecting it against tarnish and corrosion.

E—446. Space-saving Circular Tank—A new compact, circular vapor spray degreaser, designed for operating economy and convenience, has been introduced by Circo Equipment Company, Rahway, N. J. to complement its complete line of solvent degreasers, ultrasonic cleaning apparatus and metal parts washers.

In addition to unique circular construction which reduces floor space requirements, increases accessibility and simplifies servicing. Circo's Model OP2-D30 features unobstructed tank walls with recessed condensate trough for effective solvent reclamation. This trough serves as a reservoir for distilled, pure solvent which is fed by means of a leak-proof and corrosion resistant pump to a flexible hose and spray lance with fan-type nozzle.



Vapor Spray Degreaser

Interior of the standard tank, as well as other critical surfaces, are zinc metallized for protection against corrosion. Stainless clad steel construction is available for greatly increased service life. Other advantages include use of galvanized pipe and fittings; easily removable, sturdy work rest; comfortable work height and removable cleanout door. All seams are electric arc welded and exteriors are painted in solvent resistant machinery gray.

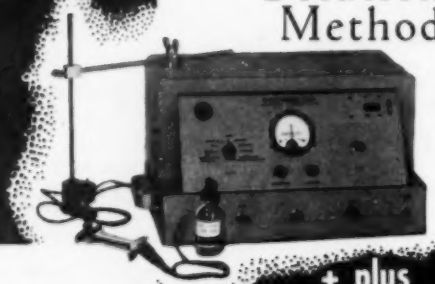
E—447. One-Man Drum Handler—A new, improved drum lift which enables one man to handle steel drums, fibre drums, and acid carboys has been announced by the manufacturer, Sterling, Fleischman Company, Broomall, Pa.

For Pouring

Sturdy, of all-steel construction, the Sterling Drum Lift is rated at 750 pound capacity. Lifting power is supplied by a foot-operated hydraulic jack. Drums can be raised for pouring to a height of 53 inches. They may be stacked two-high vertically. The center of gravity of the drum is always maintained within the four casters, making it impossible for the lift to overturn.

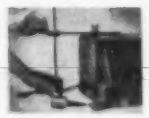
Check plating thickness WITH THE KOCOUR ELECTRONIC THICKNESS TESTER

*Anodic Solution Method



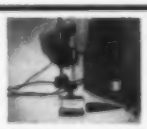
6 Simple steps . . . to quick, accurate results

1. MOUNT THE CELL . . . on the spot to be tested and clip lead wire to specimen.

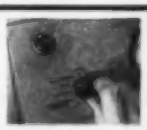


2. ADD TEST SOLUTION . . . which corresponds to the type of plating and base metal tested.

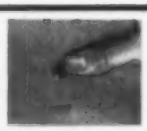
3. PLACE STIRRER IN POSITION.



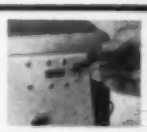
4. SET SELECTOR SWITCH to the type of plating to be tested as indicated on panel.



5. PRESS THE TEST BUTTON to start the test . . . and upon completion the unit shuts off automatically.



6. TAKE THE READING directly from the counter on panel i.e., 0.00041".



TOTAL TIME . . . less than 2 minutes

+ plus these features

- DETERMINE THICKNESS OF decorative chromium, heavy chromium, silver, copper, tin, brass, cadmium, nickel, zinc, lead, lead-tin alloy, tin-zinc alloy on various base metals and materials.
- WIDE THICKNESS RANGE
- DIRECT READINGS
- 90-95% ACCURACY
- TESTS ARE RAPID
- VIRTUALLY AUTOMATIC
- ELIMINATES HUMAN ELEMENT

Don't delay! See how the Electronic Thickness Tester can solve your problem. Write for literature today.

KOCOUR CO.
Pioneers in Control for the Plating Industry

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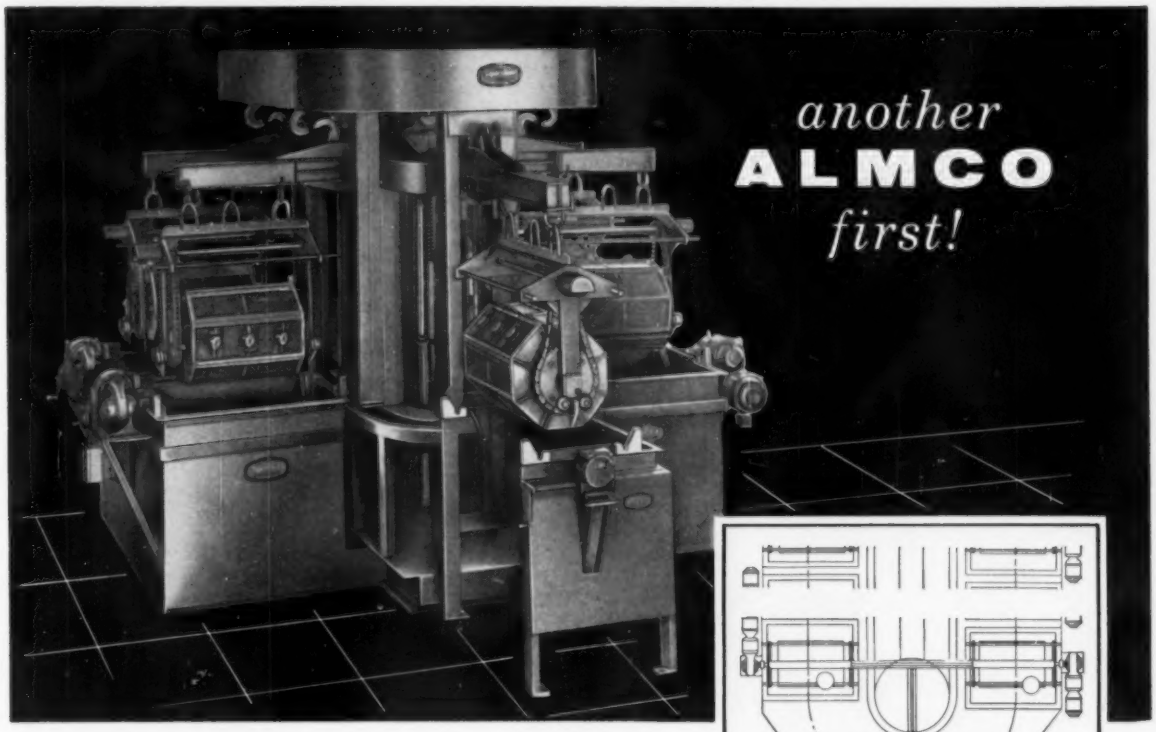
Chicago 32, Illinois

AUTOMATION / comes to BARREL FINISHING



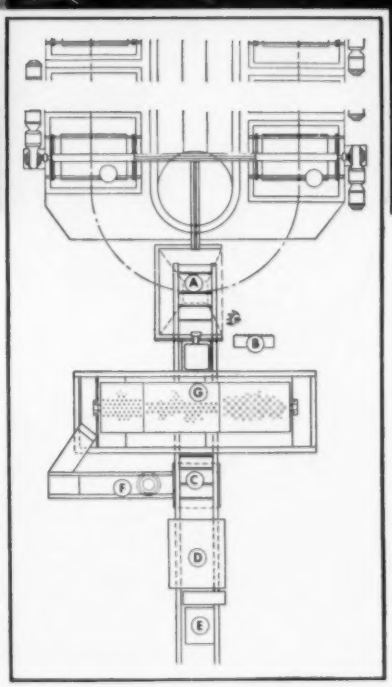
From Detroit . . . Cleveland . . . Chicago . . . New York . . . almost every metal-working center—for more than a year—queries have been coming in asking, "What's this about ALMCO's automated barrel finishing?" Here, for the first time, are all the facts . . .

COMPLETELY AUTOMATIC OPERATION. Supersheen ***SUB-O-MATIC*** submerged-type automated barrel finishing systems, researched and developed exclusively by ALMCO, daily are achieving micro-precision grinding and burnishing of mass production parts by the push of a button. These highly versatile systems can be engineered to handle almost any production requirements; micro-finishing operations performed include descaling, deburring, grinding, burnishing, rinsing and rust inhibiting. And one man, by pre-set controls, maintains continuous production ***through all operations.***

Vital to the peak efficiency of these systems are specially engineered materials handling units (*see diagram*). Even delicate centerless ground steel parts are automatically handled without impingement or peening action. Too, the media is loaded, unloaded, separated and reclassified automatically after every cycle, thus eliminating possible errors or mix-ups.

TREMENDOUS COST SAVINGS. Besides absolutely unequalled finishes on high production parts, cost savings are so great that a Supersheen ***SUB-O-MATIC*** System can actually pay for itself ***in less than one year!*** Money saved on finishing compounds alone can, in some cases, do this. Reduced labor costs, greater production and better finishes are other positive advantages which Supersheen ***SUB-O-MATIC*** Systems have already brought the metal-working industry.

Let us sample process your production parts in the Supersheen ***SUB-O-MATIC*** System in our Albert Lea laboratory; you'll quickly see how you can achieve ultra-low micro-inch surfaces and closely-formed radii—not now obtainable by other methods—even by other barrel finishing processes—at tremendous cost savings to your company. Write for the new Supersheen Automated Barrel Finishing Catalog, ABF-111.



Parts and media are loaded and unloaded at Station (A). All operations automatically controlled at CONTROL PANEL (B). Parts and media are metered to MAGNETIC SEPARATOR (C). Parts pass along conveyor through DRIER (D) and then to "pick-off" table for assembly or storage. Media drops into VERTICAL BUCKET ELEVATOR (F) and is carried up to ROTARY SCREEN CLASSIFIER (G) where various size media are separated and drop into overhead hopper. Barrels are then reloaded with correct media by air-operated control and ready for new finishing cycle.

ALMCO
DIVISION OF
QUEEN STOVE WORKS, INC.
ALBERT LEA, MINN.

EQUIPMENT & SUPPLIES

E—448. Hi Temp Pressure Gauge—A compact, precision instrument capable of giving continuous and accurate readings of pressure under prolonged exposure to high temperatures and radiation has been developed by the Callery Chemical Company.

The Callery High Temperature Pressure Gauge, Model C, is available in standard and special pressure ranges. It operates on alternating current from 60 to 400 cycles in continuous radiation flux of one million Roentgens per hour.

The gauge may be installed on any pipe or vessel for use with high temperature liquids or gases. Its application is not limited to any specific liquids or gases as the pressure-sensing bellows may be manufactured from a wide variety of resistant materials with its scope of usefulness increasing accordingly.

The instrument consists of the bellows, a differential transformer and a meter to indicate variations in the transformer output. The bellows and transformer constitute one compact unit connected by cable to the receiver which may include either a direct-reading or a recording meter.

The gauge operates by measuring the change in electrical output in the secondary of the differential transformer caused by movement of the core. The core is connected by a direct linkage to the bellows. Any change in pressure on the bellows causes a directly proportional movement of the core, which, in turn, induces a variation in the electrical output of the transformer. The gauge is not temperature sensitive.

BUCKINGHAM
POLISHING
and
BUFFING COMPOSITIONS

- Stainless Steel Composition
- White Finish
- Tripoli
- Chrome Coloring Composition
- Greaseless Composition
- Emery Cake
- Brass Coloring
- Emery Paste
- Burring Compound
- Grease Stick
- Spray Pastes Stainless Steel Tripoli

Representation in Major Cities *Write Dep't. B for Samples*

The BUCKINGHAM PRODUCTS Co.
14100 FULLERTON AVE. • DETROIT 27, MICH.

E—449. Blow It Out, Suck It In—The Clemco Educt-O-Matic is the first completely self-contained abrasive cleaning tool. Its light weight (11 pounds, including abrasive) allows its operation inside tanks, on ceilings, floors, cleaning before and after weld and on many other production or maintenance problems.

Lightweight Cleaner

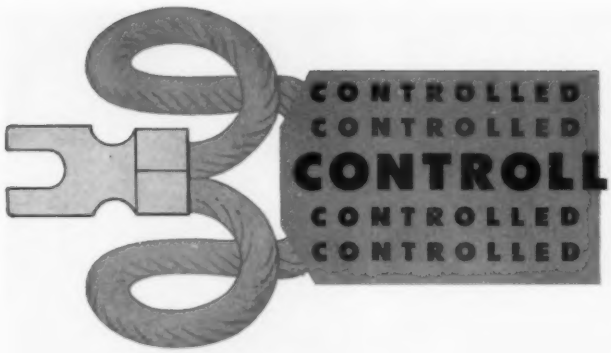
The Educt-O-Matic's patented features provide complete recovery of the abrasive and dust. The efficient cyclone removes the dust into the attached bag and allows the abrasive to re-enter the hopper for re-use. No dust or flying abrasive.

A single ½-inch air line is the connection required. The Educt-O-Matic operates on 33 to 60 CFM air supply.

No larger or heavier than a small vacuum cleaner its single control permits its efficient operation by any production worker.

Swiveling Shelves

E—450. Steel Shelf Carts—Bernard Franklin Co., Inc. has announced an outstanding new line of all steel shelf carts. Franklin carts feature 2-way reversible steel shelves, 1¼ inch x 1¼ inch x ⅛ inch angle legs, ball bearing swivel casters, tubular pusher handle, necessary assembly hardware, finished in green baked enamel. Available in a variety of types and sizes.



CONTROLLED CURRENT...

gives you the most efficient source of low-voltage dc

Chandeysson

BRUSH IMPROVEMENT PROGRAM CONSTANTLY INCREASES MOTOR GENERATOR EFFICIENCY

The almost astounding efficiency of today's motor generator brushes is due in part to Chandeysson's pioneering Brush Improvement Program. In the Chandeysson test lab, brushes are run day and night on a regular motor generator set up to duplicate typical shop conditions. **Chandeysson brushes must prove durable enough to give a minimum of 5 to 7 years of service . . .** even under severe conditions. These brushes are made of a special copper-graphite material that has low resistance along the current path . . . yet high resistance across the brush to avoid circulating currents.

Precision testing such as this is constantly carried on by Chandeysson. Unified responsibility for the manufacture of every component . . . from selected raw materials to the finished product . . . is in the hands of skilled men with decades of experience in building low-voltage generators. Our aim in engineering is to *prevent* design defects . . . rather then to correct for them. This is why more and more "Industry Leaders Choose Chandeysson!"

MAKE US PROVE to you that a Chandeysson Motor Generator set is your most economical and dependable source of low-voltage dc current. Mail this coupon today . . .

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4078 Bingham Avenue, St. Louis 16, Mo.

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Company.....

Address.....

City.....*Zone*.....*State*.....

CHANDEYSSON ELECTRIC COMPANY

CHA77-RR

4074 Bingham Avenue, St. Louis 16, Mo.

EQUIPMENT & SUPPLIES

E—451. Zn-Cu Alloy Electrodeposit—Promat Division, Poor and Co., Waukegan, Ill., announces the development of an alloy electrodeposit of zinc and copper identified as Probrite.

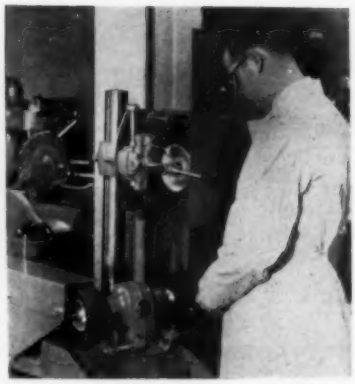
Probrite alloy may be plated full bright in thicknesses up to 0.0003 inch or may be plated dull to a thickness of 0.001 inch, and buffed to full brightness. The buffing grade of Probrite has excellent flow-out and eliminates the necessity for using plating grade quality finish base material. These bright deposits may be chrome plated for added color and sealed in Promat Proseal S-30-A for protection against the formation of white corrosion products.

Although its widest use is found in indoor application, the new improved Probrite process meets the requirements of many outdoor applications.

One of the principal advantages found in using Probrite is the availability of the metals which make up the deposit. Recent improvements in bath control methods and modification of brightening agents have resulted in reducing the original cost of the process.

E—452. Belt Grinders—Four improved models of the Delta 2½-inch belt grinder featuring new rubber contact wheels and improved belt alignment adjustment have been introduced by Rockwell Manufacturing Company's Delta Power Tool Division.

The new contact wheels enable the user to obtain a better finish in less time. They also reduce costs by increasing the life of abrasive belts. The hubs are designed to accommodate standard tires 2½ inches wide and 6 inches in diameter so that tires may be easily replaced from most industrial distributors' stocks.



Backed Belts

For easier and more accurate belt alignment, the standard back stand idler units in the new models are designed to make possible lateral adjustment of the drum. They also still have the hand knob control for belt tracking adjustment.

The new models are also being shipped to dealers as an assembled unit for the first time, allowing for faster service and easier display.

E—453. Bright Bronze—A new process in the Lustralite line has been developed by the Battelle Development Corporation of Columbus, Ohio. The product is a bright bronze decorative plate of about 90 per cent copper and 10 per cent tin. It is called Bright Lustralite 10, to distinguish it from regular Lustralite 10, which is not so bright and is used in engineering applications.

Bright Lustralite 10 can be used instead of copper and/or bright-nickel plate to protect steel and zinc die castings from corrosion. Bright Lustralite 10 is plated directly with chromium, by using the conventional bath for chromium plating, or is directly plated with bright nickel and chromium without the necessity for buffing.

The plate is mirrorlike. For color plating the true red-bronze appearance can be preserved by lacquering. A bright golden color variation can be produced by changing the formula to 85 per cent copper and 15 per cent tin.

The Bright Lustralite 10 bath, like the regular Lustralite 10, 20, and 45 baths, has excellent throwing power, making it especially useful for uniform plating of complex-shaped parts. Leveling power is exceptional with rough surfaces smoothed as much as 60 per cent by plating only 0.0007 inch of Bright Lustralite 10.

The plate is uniform in brightness over a wide current-density range. The plating salts and brightener are stable. Control is similar to that of a bright-copper bath. Cathode efficiency is between 50–70 per cent; anode efficiency between 70 and 90 per cent. Thus, the anodes not only supply the metal plates or the cathodes but also replace the metal ordinarily consumed by dragout.

Photo courtesy: Hanson-Van Winkle-Munning Co.

PERMANENT PROTECTION . . .
. . . Against Corrosion, Contamination, Abrasion

Manhattan Rubber Linings give you the kind of cost-saving protection you need in metal plating and pickling operations. They are made from multiple calendered sheets of rubber, bonded so securely mechanical pull tests prove they can't be separated! This means you get *lasting* protection against corrosion of your equipment or contamination of solutions used in processing . . . *positive* protection from the dangers of stray currents in plating operations. It's the kind of *permanent* protection that has kept many Manhattan Rubber Lined plating tanks in continuous use for over 30 years!

Any equipment that can be shipped can be lined by Manhattan. Every tank lined by Manhattan is tested under high voltage to detect any possible imperfections before it is shipped back to your plant.

For perfect, bonded protection of your costly equipment . . . *permanent* protection against corrosion, contamination and abrasion . . . consult the R/M rubber lining plant nearest you.

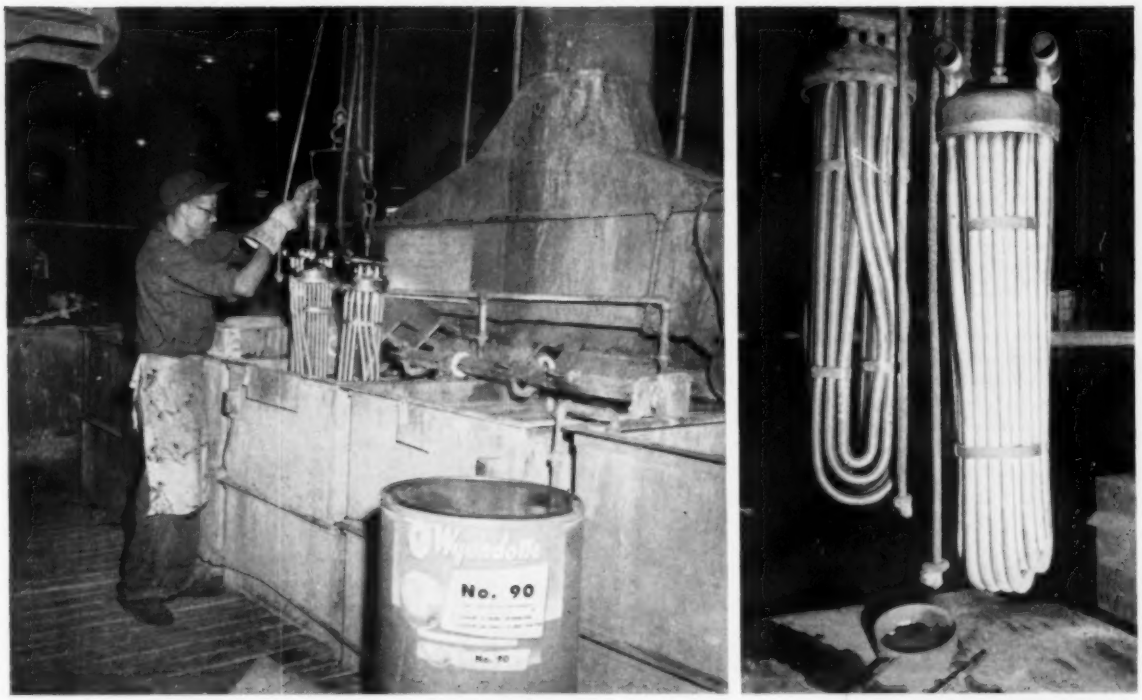
RUBBER LINING PLANTS AT PASSAIC, N.J. • NORTH CHARLESTON, S.C.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles Engineered Plastic, and Sintered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 447.



Acme Industries, Inc., Jackson, Michigan, well-known manufacturers of air-conditioning and refrigerating equipment, use Wyandotte 90 to clean and remove copper-oxide tarnish from finned-tube copper coils. Right: coils before and after cleaning.

Electrocleaning with Wyandotte 90 saves Acme Industries over $100 weekly

"Before switching to WYANDOTTE 90," says Acme's master mechanic, Ward Swarthout, "we had been using a proprietary electrocleaner for soil removal, then a rinse, and an electrolytic cyanide treatment for oxide removal on refrigeration condenser coils. The danger involved in using sodium cyanide, plus the expense of its purchase, handling, and waste disposal made it undesirable."

Looking for a more efficient, economical way to clean and brighten these coils, Acme Industries found that WYANDOTTE 90 did the job in *one* operation, replacing the costly, time-consuming three-step process formerly used.

"Through elimination of the electrocyanide bath," Mr. Swarthout goes on, "WYANDOTTE 90 is saving us $100 a week — and that's just the cost of the cyanide alone. It doesn't take into account savings in time, and safer, cleaner work."

WYANDOTTE 90 is unique among electrocleaners in its ability to clean and brighten copper parts, or buffed copper before plating. In addition, it is an outstanding heavy-duty reverse-current steel cleaner, combining exceptional properties of smut removal, chrome tolerance, and controlled foam.

To test WYANDOTTE 90 for your electrocleaning, call your Wyandotte representative or jobber. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*

Wyandotte CHEMICALS

J. B. FORD DIVISION

SPECIALISTS IN METAL-CLEANING PRODUCTS

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan

☐ **Please send further information on Wyandotte 90**

☐ **Have representative call**

Name_____

Company_____

Address_____

City_____ Zone____ State_____

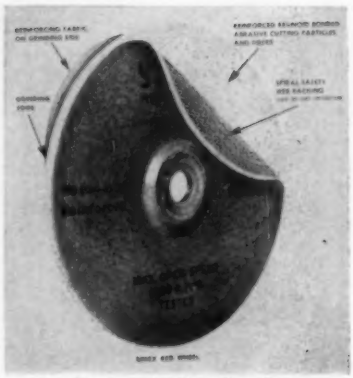
EQUIPMENT & SUPPLIES

E—454. Pipe Dope—A Teflon based pipe dope which has given excellent performance in threaded pipe and fitting assemblies with corrosive and difficult-to-hold liquids is now revealed to have unusual powers in minimizing seizure or galling. This latter problem has become acute with the wider use of stainless steels and similar alloys which have marked tendencies to seize and gall in service.

ECO Engineering Company of Newark, N. J. recommends T-Film®, both as a pipe sealant for corrosive or hazardous fluids and as an anti-seizing agent for use with alloys that gall readily, or in all cases where frequency or ease of disassembly of threaded elements in undamaged state is important. The use of T-Film® permits the economical reuse of expensive alloy valves and fittings, as well as the use of threaded components in lieu of costlier flanged, gasketed or welded assemblies. Similar advantages are noted for use in assemblies of dissimilar metals. In addition to its anti-seize qualities, T-Film® acts as a protective barrier, minimizing the possibilities of galvanic corrosion.

E—455. Extra Strong Wheels—A novel construction feature imparting extra strength and safety to high speed abrasive wheels has been incorporated in the new Simex Red Wheels recently developed by Simonds Abrasive Co., Philadelphia, Pa. This improvement is a special safety web backing of spiral wound rayon auto tire cord.

Simex Red Wheels are a lightweight, rigid type reinforced resinoid bonded abrasive wheel for use on portable disc type and right angle type portable grinders. They are made in depressed center or raised hub shape in 7 inch and 9 inch diameters by 3/16 inch and ¼ inch thicknesses. Their field of application is for rough, tough production grinding especially for grinding welds, removing flash and bead, cleaning up rough ragged surfaces and edges, and for all types of stainless steel. Their fast abrasive cutting action permits heavy stock removal and their durable construction gives extra long wheel life. They outlast conventional abrasive cloth discs as much as 40 to 1, with resultant time and labor savings due to fewer wheel changes. The Simex Wheel itself is more than a laminated product. It is made like a conventional grinding wheel—from a wheel mix consisting of abrasive cutting particles and synthetic resin bonding agents, reinforced with alpha cellulose fibers criss-crossed and knitted together throughout the wheel mass. In addition to the extra safety web backing on the top side the under, or grinding, side is further strengthened with a layer of reinforcing fabric. This combination provides equal and added strength in all directions of force applied on the wheel. There is a knurled or file-type pattern on the grinding or cutting side of the wheels to increase their cutting action.



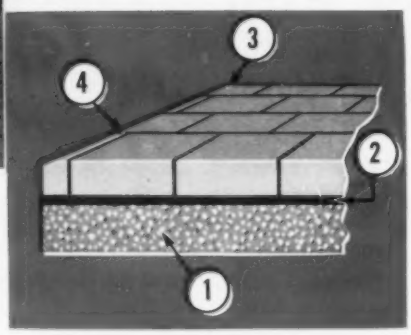
Stronger At High Speeds

E—456. Solution Conductivity Controller—An electronic instrument for controlling the conductivity of solutions has been developed by Fielden Instrument Div. of Robertshaw-Fulton Controls Co.

The instrument should find wide application in the water treatment, chemical, nuclear energy, power and metal processing industries, where it can be employed in controlling water purity, presence of specific chemicals in solutions, baths, etc.

Designed for simplified use and operation, the controller is equipped with two zone action for both alarm or control. A single set-point knob on the front provides control within the range of the instrument calibration. It is available in two standard ranges of conductivity: 0 to 30 micromhos/cm², or 20 to 200 micromhos/cm², for use with conductivity cells having a constant of one. The scale calibration is nonlinear and provides maximum readability at high specific conductivities.

Here's why this
ACID PROOF FLOOR
will last for
FIFTY YEARS
or more!



. . . and will cost practically nothing for maintenance

1. It is built on a rigid, solid sub-base — 4" to 6" thick.
2. The sub-base is protected by a thick corrosion-resistant "Resilon" membrane.
3. Over the membrane, a course of dense, tough, spall-resistant "USSCO" acid brick.
4. Bonded by wafer-thin, non-porous joints with "Durisite" acid-and-alkali resistant cement.

Yes, here's a corrosion-resistant floor that will outlast the building itself. Expensive? Savings in maintenance, alone, will make it over the years the lowest cost floor you can install.

Write for this free booklet!

Detailed construction drawings showing approved methods of building floors, trenches, gutters, tank and motor supports, etc., with full technical data, photographs and case histories. Ask for Bulletin AB-17.

PROCESS EQUIPMENT DIVISION

U. S. STONEWARE

AKRON 9, OHIO

1. BLUNTED POINT DEBURRS IN SMALL HOLES
2. BROAD BASE PREVENTS LODGING
3. ROUNDED SURFACE DOES COMPLETE POLISHING JOB
3M RESEARCH

Announcing...

"HONITE"® BRAND CERAMICONES

Now...a precision medium for critical barrel finishing

"HONITE" Brand CERAMICONES — with unique composition and shape — mass produce precision finishes on critical work pieces that could never be tumbled in a barrel before. Made of high-strength ceramic, they are high-pressure molded to close tolerances, are next-to-diamonds in hardness. Non-crystalline structure resists fracture and gives long wear over prolonged runs. Non-porous composition gives CERAMICONES extra durability — they are not contaminated by compounds or finely divided particles in the barrel.

Because of their *exclusive* truncated cone shape, *every part of each chip is a working surface.* The apex is designed to enter and deburr small holes and the broad base prevents lodging . . . polishing is accomplished with the rounded surface . . . the sharp edge is a burr remover . . . uniform size and shape prevent wedging. Ideal for all metals from hardest steel to zinc die castings on all types of finely-machined parts. And, they remove flash and fin marks on molded plastics, *without scratching* the surface.

Look what leading manufacturers have found:

- CERAMICONES helped a Michigan company cut barrel finishing time on steel window latch assemblies, and produced a brighter finish than was obtainable with ordinary chips.
- A Michigan firm making zinc die cast name plates found CERAMICONES produced a brighter finish than any other tumbling chip on the market, and cut buffing time 50%.
- A New Jersey auto parts maker found CERAMICONES did a far better job than granite on their zinc die cast parts, produced a superior finish *and* solved a chip lodging problem.

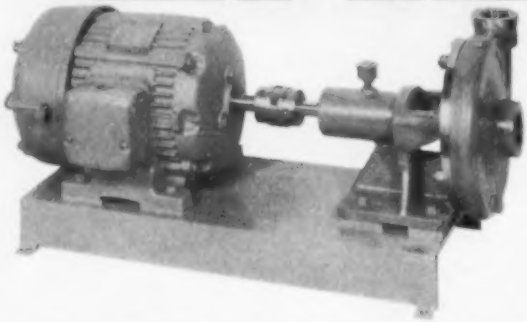
New "HONITE" CERAMICONES can improve your product quality, and cut finishing time and costs. Send us your work samples today for test processing. Write Minnesota Mining and Mfg. Co., Dept. FC-46, St. Paul 6, Minn.

Honite® BRAND CERAMICONES

Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City. Makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Undercoat" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

3M COMPANY

"... this Pump has a Patented Mechanical Seal to Reduce Maintenance



... and is Tailored for All Plating Requirements!"

Steadfast announces the addition of a line of Service Pumps for the Plating Industry. These high efficiency centrifugal pumps designed by a proven manufacturer with 35 years experience is your assurance of precision fits and quality workmanship.

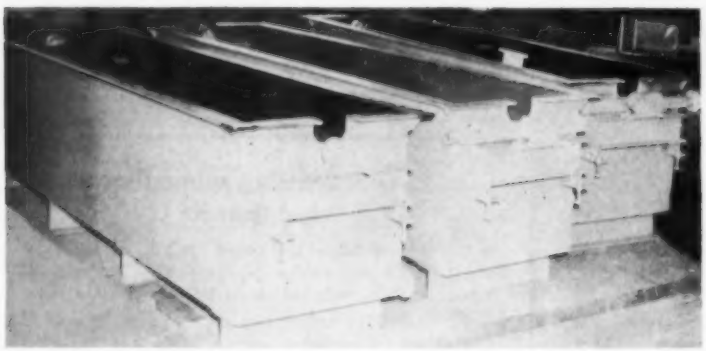
Available in the following Materials: Cast Iron, Stainless Steel, Durimet, Hastelloy, Bronze, Hi-Temp Lucite and others depending upon requirements. Pump Ratings from 300 gph to 12,000 gph. (We invite your inquiries.)

Patented mechanical seal eliminates the troublesome stuffing box and costly down-time. Tests on this mechanical seal have shown two years continuous 24 hr/day operation without any maintenance required.

STEADFAST INDUSTRIES, INC.

4731 W. Madison St., Chicago 44, Ill. • Phone: Columbus 1-7478
(In Canada, Write Armalite Co. Ltd.)

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 451.



Stronger, Tighter, Longer Lasting

Stortswelded plating tanks are built to give you the full normal life of the construction material—full strength, full section welds, sound, tight welds throughout. More than thirty years of specializing in serving the needs of platers is your assurance that your tank fabricating is in good hands when you leave it to Storts.

42 STONE STREET — STORTS WELDING COMPANY INCORPORATED — MERIDEN, CONN.

Manufacturers of Welded Fabrications to Specification

EQUIPMENT & SUPPLIES

Bigger Package

E—457. Big Can—Krylon, Inc. announces the largest seamed aerosol can ever made commercially for its spray enamels and coatings. It is a 17.8 ounce aerosol can at the same price as Krylon's former 12 ounce size, which is being discontinued.

In addition to spray acrylic plastic and spray enamels, Krylon also markets other spray products such as stencil inks, Rust Veto, Hide-A-Mark and zinc chromate metal primer.

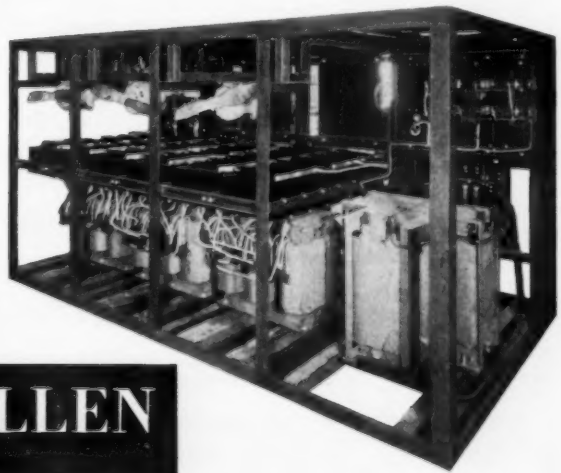
3900° F Melting Point

E—458. Ultra-High Temperature Crucible—Since 1946, researchers have worked on the production of "cermets" (ceramic-metals combinations) based on zirconium boride. The result: "Borolite" zirconium boride 101, a marked advance in powder metallurgy, which is the basis of a new Fisher crucible with superb high-temperature and corrosion-resistant properties. The new tough crucible, designed to be a workhorse in metallurgical labs, has a melting point of 3900° F.

The stress-to-rupture life at 1800° F. and 14,000 psi is 1000 hours in still air.

They may Look alike

. . . but they're as different as one day from another. Rectifiers, too, are highly individualized. They're built to meet your specific industrial needs, as prescribed by Richardson-Allen's staff of experienced engineers. Years of "know-how" are evidenced in these custom made precision-built rectifiers. Richardson-Allen . . . builders of the finest in rectifiers—selenium, germanium, etc. Write today for complete information.



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CORPORATION
DEPENDABLE RECTIFIER SPECIALISTS

a manufacturing affiliate of **WESLEY BLOCK AND CO.**, 39-15 MAIN STREET, FLUSHING, N. Y.
IN CANADA: Richardson-Allen of Canada, Ltd., 370 Victoria St., Toronto, Canada

EQUIPMENT & SUPPLIES

E—459. Self-Primers—Sethco Manufacturing Co. reports an addition to its LSIN line of self priming filter pumps for filtering corrosive solutions.

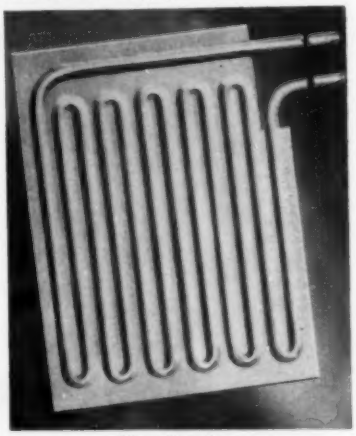
This addition is Model LSIN-20 which is rated at 200–300 gal/hr filtering capacity. The design of the filter assembly of this model differs from previous designs of smaller models in the sealing arrangement of the filter tubes. Heretofore, sealing was obtained by means of a cover which sealed both filter tube and filter shell at the same time.

Model LSIN-20 has a separate seal plate for sealing the filter tube as well as a cover for sealing the outer shell of the filter assembly.

The LSIN series of filter pumps will filter most corrosive solutions. Removal of particles from 150 to 1 micron can be controlled by varying the density of the filter tube in the assembly.

The LSIN series consists of a self-priming stainless steel 316 pump with neoprene impeller and a high temperature lucite filter assembly mounted on a linen impregnated phenolic panel and coupled to a totally enclosed ¼ hp motor. Portability is obtained by the use of rubber tire, ball bearing casters.

The choice of filter tubes to be used in the filter assembly depends on the solution to be filtered. Cotton, Dynel, Porous Stone and Porous Carbon filter tubes are available. Cotton tubes are recommended for filtering most dilute acid and alkaline solutions. Dynel tubes are recommended for the higher concentrated acid and alkaline solutions including oxidizing acids like chromic, nitric and fluoboric acid. Porous Stone tubes are recommended for all concentrations of acid solutions except the fluoride acids. Porous Carbon tubes are recommended for all concentrations of alkaline solutions, acid solutions and hydrofluoric acid solutions.



Heat Transferer

E—460. "At-the-top" Connections—A new line of Platecoils featuring Serpentine construction and "at-the-top" connections is now available from Tranter Manufacturing, Inc., Lansing, Mich.

Platecoils are heat transfer units designed to replace pipe coils in industrial processes requiring the application or removal of heat. They consist of two embossed metal sheets welded together to provide a preformed channel for the flow of heating or cooling media.

The right-angle inlet and outlet fittings on the Style 50 Platecoils make them especially suitable for use in open top tanks. They can be quickly hung in position, with all threaded connections above the solution level, permitting quick, easy removal for cleaning or inspection without draining the tank. The Serpentine layout of the channel provides continuous, in-line flow of the heating or cooling media.

E—461. Plater's Putty—The Anderson's Plastics Company, Natick, Mass., offers two types of Platers' Putty. They are particularly useful in hard chrome plating as they are resistant to chromic acid as well as other acids, alkalis and salts.

Platers' Putty formula No. 5 is an excellent stop-off for threaded holes and other cavities. It can be used to cover or cap nuts, screws and gear teeth. It is a plastic solid that can be softened by kneading with the hands and has a dry surface.

Platers' Putty formula L is a stop-off in the form of a heavy bodied oil which has the same resistance to acids and alkalis as formula No. 5 but is easier to apply by dipping or by camels hair brush. The surface of the putty can be set or dried by immersion in hot water or other means of heat (200° to 250° F) for a few minutes.

Neither formula No. 5 nor L will dry out or harden even if left in open. They can be used as described above or if a more permanent cap or rack coating is desired, the heat must be increased.

compare Chromates and choose Promat

PROSEAL #9 — Used extensively on small metal stampings, Proseal #9 is remarkably versatile. It is shipped as a dry powder for your added economy.

PROSEAL #1-3 — This time-tested Chromate is already used by the vast majority of refrigerator manufacturers for shelving.

PROSEAL #D-37-C — Also shipped as a powder for economy, this single bright dip Chromate conversion coating for electrodeposited zinc is highly resistant to the formation of white corrosion products and is an excellent paint base.

PROSEAL #18 — This Chromate conversion coating as applied to zinc base die castings is economical, easy to control and meets all the requirements for the protection of non-decorative zinc base die castings.

PROSEAL #2080 — This bronze phase coating meets all military requirements as applied to zinc electrodeposits where extreme service conditions are experienced.

These are but a few of the many Chromates available at Promat.

P-4

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Philadelphia, Pa. Waukegan, Ill. Gardena, Calif.

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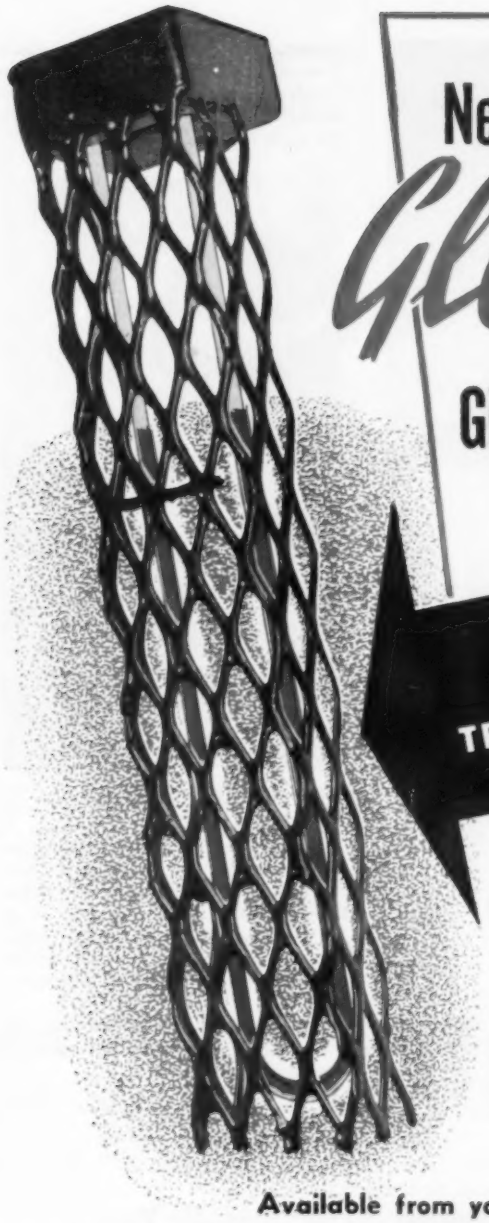

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*Trademark Reg. U.S. Pat. Off. **WILLOUGHBY, OHIO** Phone: Willoughby 2-5521

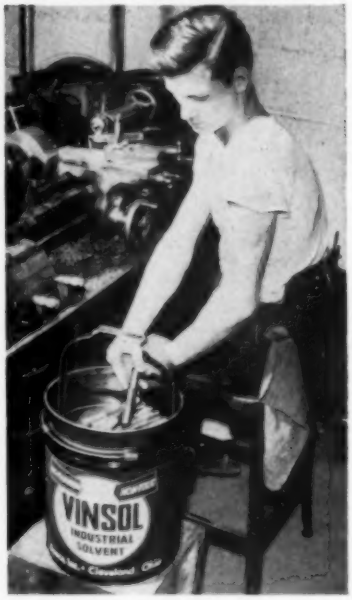
EQUIPMENT & SUPPLIES

E—462. Polyethylene Tanks—Designed for storing and mixing chemical solutions in laboratory or plant production applications, a new line of polyethylene tanks, equipped with draining faucets, is now available as off-the-shelf items from the American Agile Corporation.

The tanks are ideal for handling electroplating baths, cleaning solutions, and other corrosive media. Their principal advantage is their exceptional service life as opposed to metallic containers with accompanying high replacement costs.

Long-lived Containers

E—463. Solvent—Speco, Inc., Cleveland, announces a new industrial solvent that is reputed to have cleaning properties closely resembling carbon tetrachloride, but up to 20 times less toxicity.



Nearly CCl_4, But Less Toxic

The manufacturer advises that the new solvent, named Vinsol, can be used with complete safety for virtually all applications, including those in confined areas. In addition, it is nonflammable, which eliminates danger of fire or explosion when used near open flames or next to grinding equipment.

In addition to a special 5-gallon dip pail, Vinsol is available in standard 1-gallon cans and 55-gallon drums.

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Serves the Plating Industry with:

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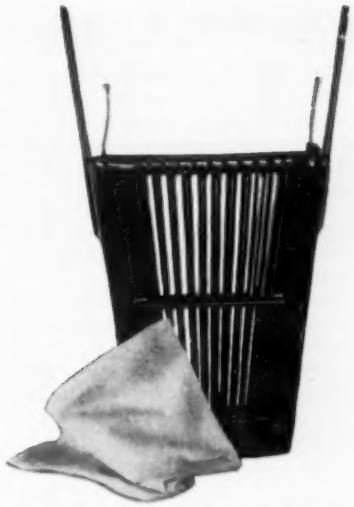
SAVINGS

Most users report more than HALF THE COST of Forcite Anode Baskets is amortised IN THE FIRST Load by saving RE-CASTING COST!



FORCITE STANDARD SERIES—from 18 to 30" long.

FORCITE—THE NEW SYSTEM THAT PERMITS THE USE OF SMALL ANODE PARTICLES WHERE HERETOFORE IMPRACTICAL . . .

Users of the Forcite Basket System have quickly discovered that total conversion throughout their plating operations is highly profitable. Specifically, not only does the system permit use of small anode particles, with important savings but also additional economies such as:

1. Greater anode area
2. Smoother deposits
3. Permit large loads
4. Use of lower cost material
5. Complete solution of anode material

WHEREVER USED SAVINGS DEFINITELY PROVE THE POINT...

Typical recent reorders give convincing testimony to how important the Forcite Anode Basket System can be to your plating operations:

IN OHIO—Plant using 42 - 48" baskets.

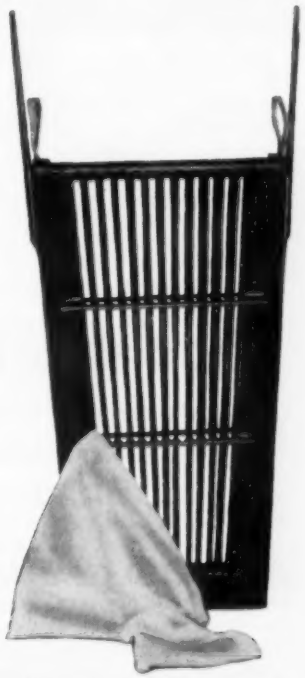
IN NEW YORK—Plant acquired a total of 20 baskets in lots of 4 to 6 over a period of six months.

IN MICHIGAN—Conversion half completed with 44 - 48" Series "15" baskets.

IN OHIO—Manufacturer tried 10 - 24" baskets and then ordered 30 additional.

IN MICHIGAN—After six months trial of 6 - 36" Series "15" baskets, ordered 70 - 36" baskets and 70 - 74" baskets as first stage of their conversion.

RESULTS SUCH AS THESE surely warrant your prompt consideration as to the savings that you too can make! Write us for name of your nearest distributor. . . .



FORCITE SERIES "15"—expressly designed for continuous rows—from 36" to 72" long.

FORCITE CORPORATION

31450 Shaker Blvd. • Chagrin Falls, Ohio

EQUIPMENT & SUPPLIES

E—464. Process Plates Bright Nickle. It is believed that a milestone in the electroplating and metal finishing field has been achieved with the commercial release of a new high-speed bright nickel plating process.*

Field tested in several high-production installations, Levelume has shown deposition rates 100 per cent higher than the fastest processes available today.

It has enabled one of the nation's leading auto parts manufacturers to more than double its production without investing in new conveyors, enlarging tanks, changing racking methods or increasing its labor force. Savings in equipment have amounted to over $1 million.

* Called Levelume, according to officials of Hanson-Van Winkle-Munning Co., which developed the process.

Practically any existing nickel plating process can be converted to Levelume in a matter of a few days, according to H-VW-M. No special auxiliary equipment need be installed. Tanks only have to be cleaned and bleached. Almost any rubber-lined tank previously used with bright nickel solution can be employed with the Levelume process.

Years of research and field testing have gone into the development of the process, H-VW-M reports. Key to its success are newly developed addition agents. With these addition agents, it is possible to use an activated carbon pack in the filter for the plating solution. This continuously removes harmful organic contaminants. Consequently, costly and time-consuming periodic batch purification is not required.

H-VW-M reports the following additional advantages of Levelume. . . .

1. Levelume is also characterized by good ductility and controlled stress in either the compressive or tensile side, which means no cracking, crazing, lifting or brittleness of deposits.
2. It is effective within a wide current density range—from 20 to 150 asf (normal 60 to 100 asf). (Higher current densities mean faster plating.)
3. The high leveling characteristics of the deposit fill in scratches to a degree which, in many cases, eliminates polishing and buffing for extra smoothness after plating; or considerably reduces required post-treatment, with subsequent reductions in production costs.
4. Objects can be double coated, if higher corrosion protection with a given nickel thickness is desired.
5. Levelume produces deposits with high surface activity, thus plated surfaces accept chromium and other deposits without additional treatment. The process, for example, reduced chromium plating rejects 12 per cent for one manufacturer.
6. Recessed areas have uniform brightness without shading.

H-VW-M also reports these extras: bath stable in operation, pleasing white color deposits, simplified control, high tolerance to impurities and low operating costs. With the bath agitated and continuously filtered, roughness of deposits is not encountered.

Levelume plating temperatures range from 145°–160° F., with 145° normal for plating zinc die castings, 160° normal for steel. *p*H runs between 2.7–3.5 electrometric. Ventilation is optional, as Levelume gives off no harmful or unpleasant odors.

Recommended composition for the Levelume solution consists of:

40	oz/gal	Nickel sulfate
8	oz/gal	Nickel chloride
5.5	oz/gal	Boric acid
3.5	oz/gal	NL-1 addition agent
0.27	oz/gal	NL-2 addition agent
0.32	fl oz/gal	Anti-Pit #5

All constituents, including brighteners, can be controlled within desired limits by simplified analytical methods.

E—465. Barrel Dolly. The new Morse Drum Dolly No. 13 is ideally designed for vertical handling of open end drums. Safety is assured by the deep lip which holds the drum securely in place. Durability is assured by the cross members which give added strength for load capacities up to 700 lbs. Four 3-inch diameter steel swivel casters make the Dolly easy to get into small areas.

Built of 2½ inch steel for long life, the Morse Drum Dolly No. 13 is 24 inches in diameter, with an overall height of 6½ inches. Cost is $9.90 FOB. Morse Manufacturing Co., 755 West Manlius Street, East Syracuse, New York.

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Always big enough to get the parts clean. Never big enough to choke the flow in your washing machine

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Cowles NEW QC WASHING MACHINE CLEANER

It's alkaline—but *more* than an alkali. NOW—for the first time—you can use

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added wetting, penetrating, soil-loosening, emulsifying power in your washing machine

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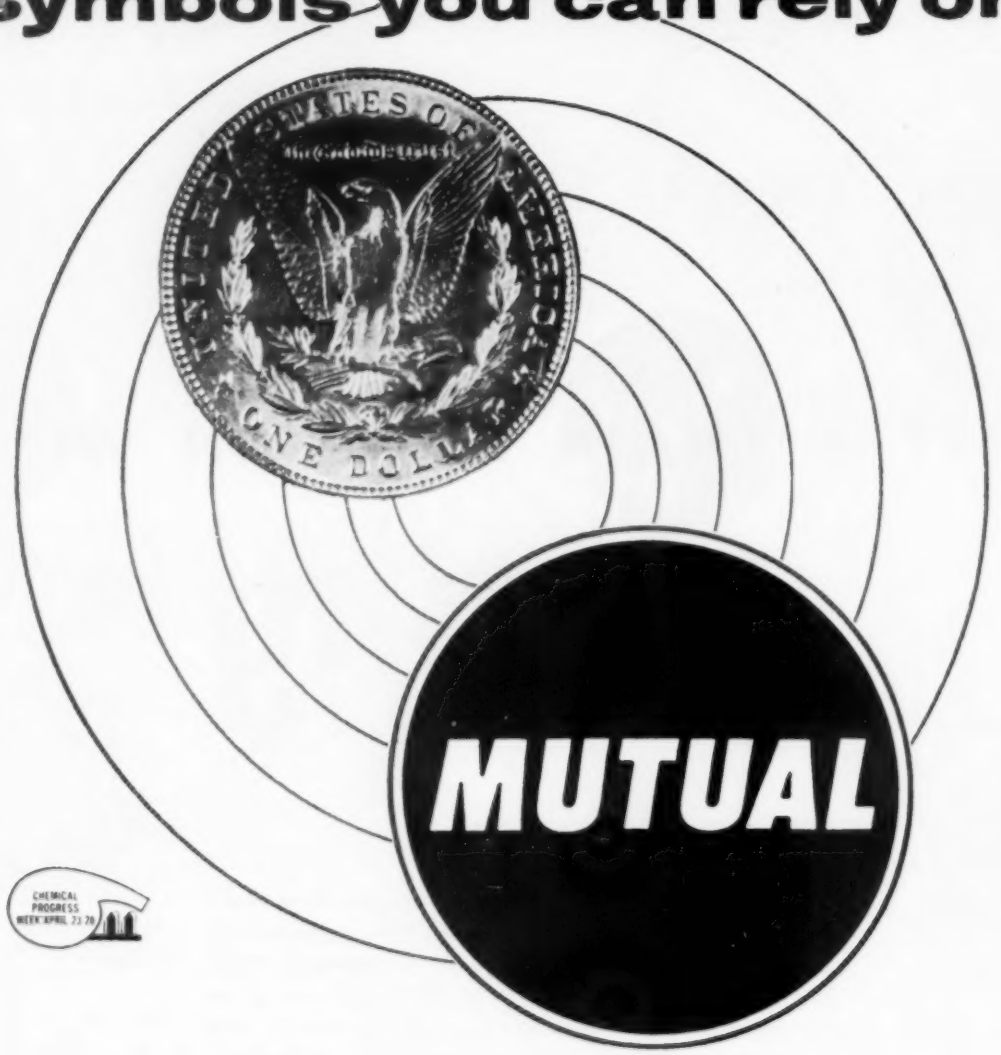

● The seal of the United States when stamped on a silver dollar assures the holder that the coin is legal tender. As such, it is accepted throughout the world in payment for goods and services.

The Mutual seal is accepted by chromium chemical buyers with a comparable degree of confidence. Over the years Mutual has acquired an enviable reputation for quality products and dependable performance. If you are not now using Mutual Chromic Acid, we would be glad to consult with you on the merits of our products and service which lead so many to rely on the Mutual trade mark.

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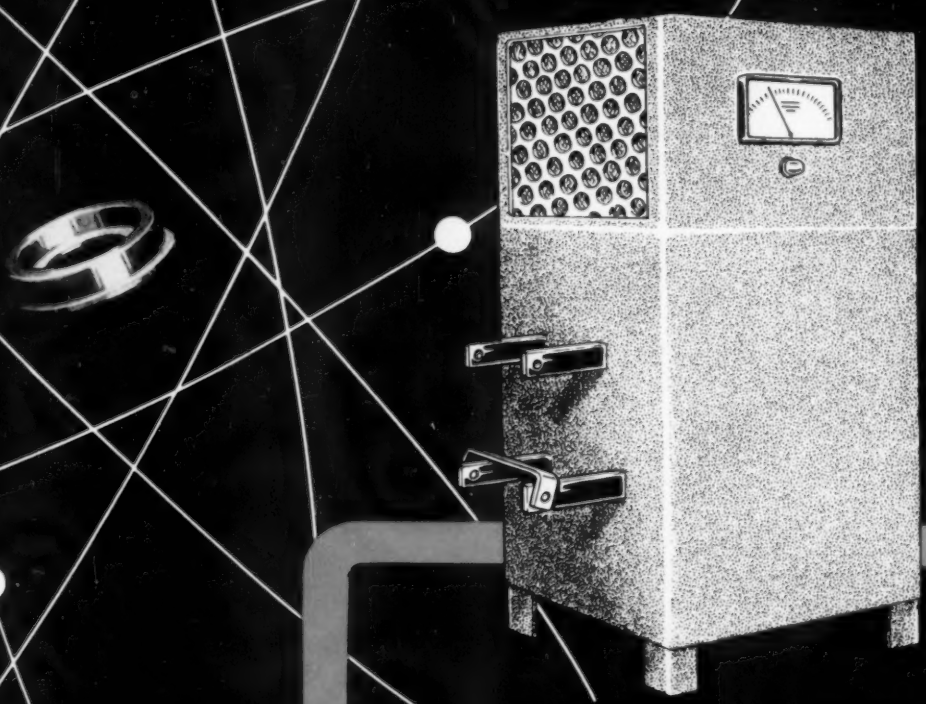
WAGNER BROTHERS

Germanium power rectifier



A permanent mechanism for low voltage, high current rectification . . . specifically designed for plating and anodizing power supplies.

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At Last! a Germanium protected

It has always been the policy of Wagner Brothers to keep its "guinea pigs" in the laboratory until research and product development had perfected a product for which no excuses need be made.

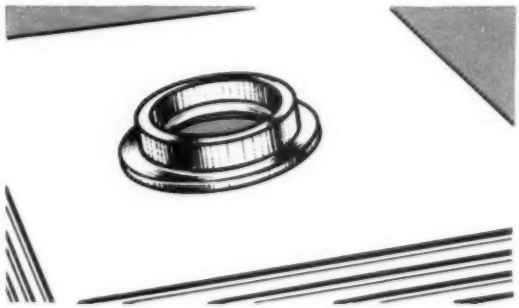
Now, after two years of experimentation and design in close collaboration with the General Electric Company, Wagner Brothers is proud to reveal the most advanced mechanism for germanium power rectification available anywhere.

EXCEPTIONAL EFFICIENCY

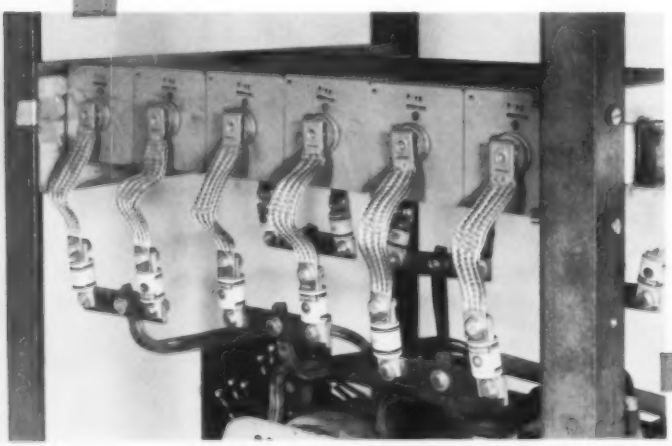
Designed specifically with the needs of the metal finishing industry in mind, the Wagner Brothers Germanium Rectifier offers you a vastly increased efficiency of operation and improved voltage regulation which is made possible by use of the germanium junction . . . *efficiencies as high as 95%, depending upon voltage and current.* And, conservatively rated Wagner Brothers' units will operate at up to 150% of rated current, without destructive effects to junctions. Voltage range from 6 to 48 volts, with current output up to 50,000 amperes, accommodates most metal finishing needs.

PROTECTED GERMANIUM CELLS

An efficient, hermetically sealed "Safety Cell" protects the germanium wafer from moisture and corrosive fumes of plating atmospheres. Basic stacks consist of six germanium cells, each with cooling fins. Every germanium cell is individually protected against circuit fault conditions and sudden overloads by easily replaced, fast-acting "amp trap" fuses.



The "amp traps" break circuit in 1/3 cycle, before damage can be done to the temperature sensitive germanium junction. All stacks are of a standard design and are interchangeable, either singly or in groups. The stack of six cells is rated at approximately 500 amperes.



COOLING SYSTEM

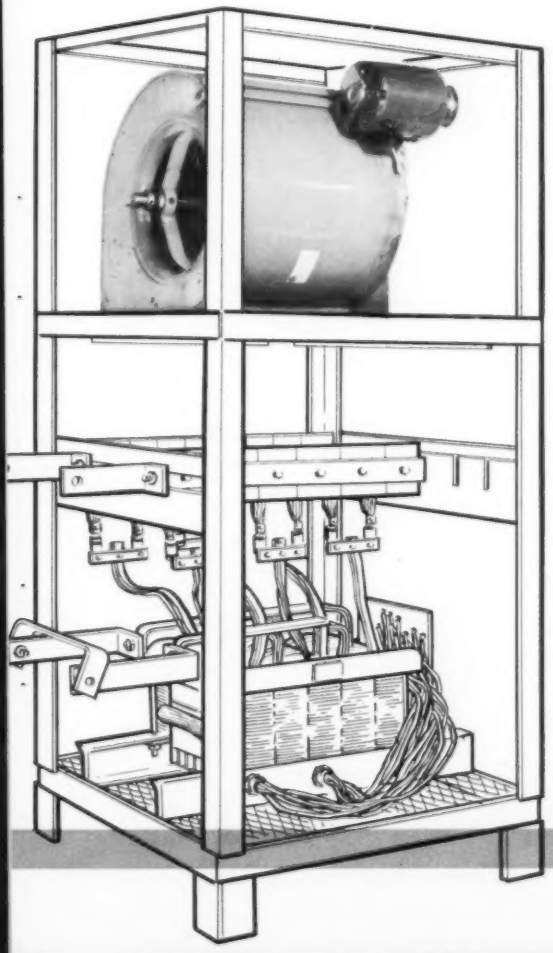
The Wagner Brothers Germanium Rectifying units are forced air cooled by an extra capacity centrifugal blower which expels warm air at the base of the cabinet. Germanium stacks are further protected from destructive temperatures due to blower failure by a pressure switch which, when the blower is inoperative, breaks input current. The blower is driven by a 3-phase motor, equipped with a separate con-

rectifier with 100% efficiency!

tactor as protection from thermal overloads. Bearings require no lubrication. An air filter screens out deteriorating particles of dusty atmospheres.

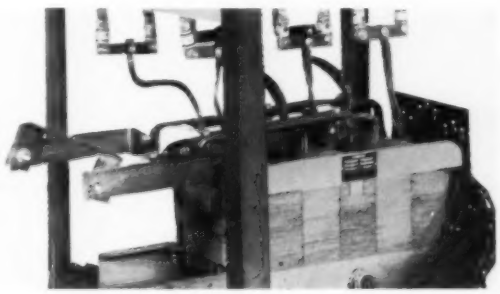
ELECTRICAL PROTECTION

In addition to individually-fused germanium cells, the Wagner Brothers Germanium Rectifier is protected against single phasing on the 3-phase circuit. The main contactor is provided with a thermal breaker for overload protection.



CONTROLS

Because various metal finishing jobs are best regulated by different types of controls, Wagner Brothers Germanium Rectifiers can be provided with any popular type of manual or automatic control: tap switch, powerstat, remote saturable reactor, mechanical magnetic reactor, etc. Controls are either situated as an integral unit on the rectifier cabinet or can be used as a remote control at any location within the plant.



TRANSFORMERS

Transformers are of our own design and manufacture, provided with Class B non-flammable insulation (glass, mica, asbestos, etc.) for safety and extra long service. They are specially designed for metal finishing applications.

COMPACT

Wagner Brothers Germanium Rectifiers are made in two basic cabinet sizes:

28″ x 28″ x 64″. . . . . up to 3,000 amperes
28″ x 52″ x 64″. . . . . 4,000 to 6,000 amperes

All major components contained within the sturdy housing are easily reached for the minimum of maintenance required.

Wagner Brothers also offers a complete range of types and sizes of selenium rectifiers.

Important features . . .

which make this a truly permanent rectifier!

HEAVY-DUTY TRANSFORMER
Conservative class B design.

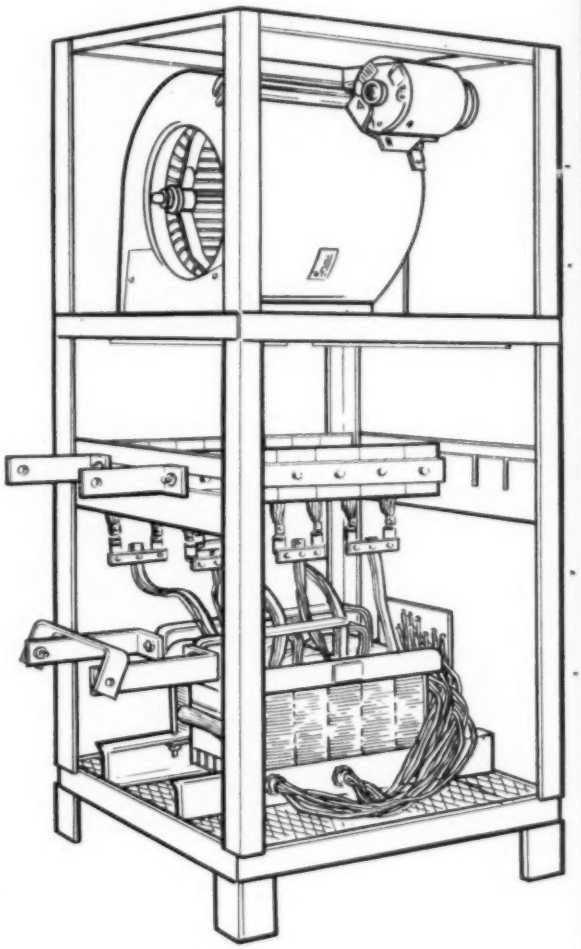
EFFICIENT GERMANIUM STACKS
Up to 95% efficient, hermetically sealed cells do not age. Individually protected against current faults.

CENTRIFUGAL BLOWER
Large capacity. No maintenance. Separate overload and thermal protective devices. 3-phase motor.

CONTACTOR
With separate thermal breaker for gradual overload protection.

CIRCUITS
3-phase circuit protected against single phasing. Low voltage circuits built-in.

CONTROLS
Separate or part of cabinet. May be located anywhere in plant.



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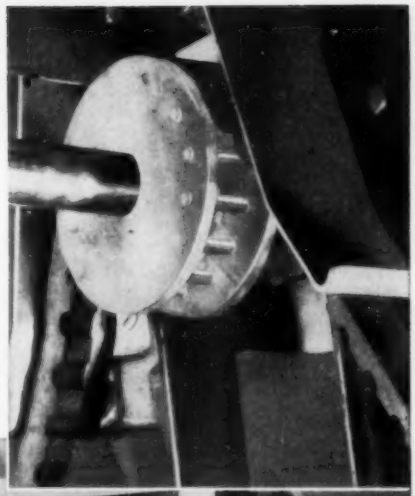

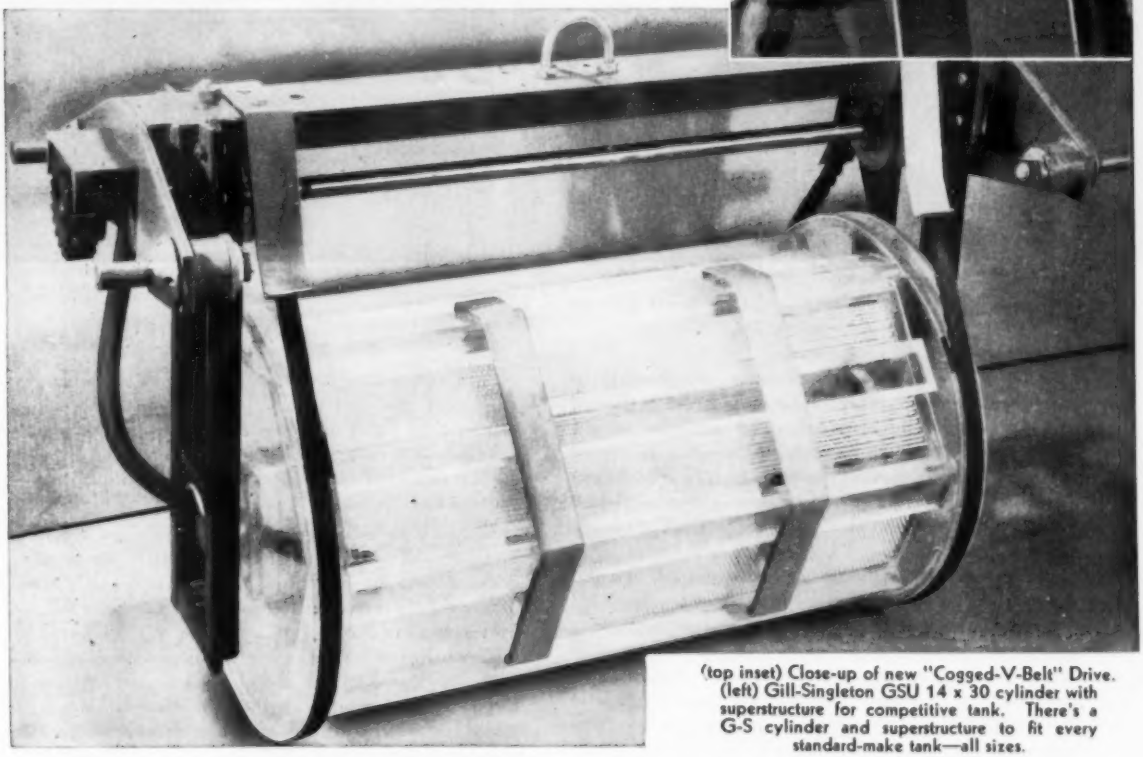

(top inset) Close-up of new "Cogged-V-Belt" Drive. (left) Gill-Singleton GSU 14 x 30 cylinder with superstructure for competitive tank. There's a G-S cylinder and superstructure to fit every standard-make tank—all sizes.

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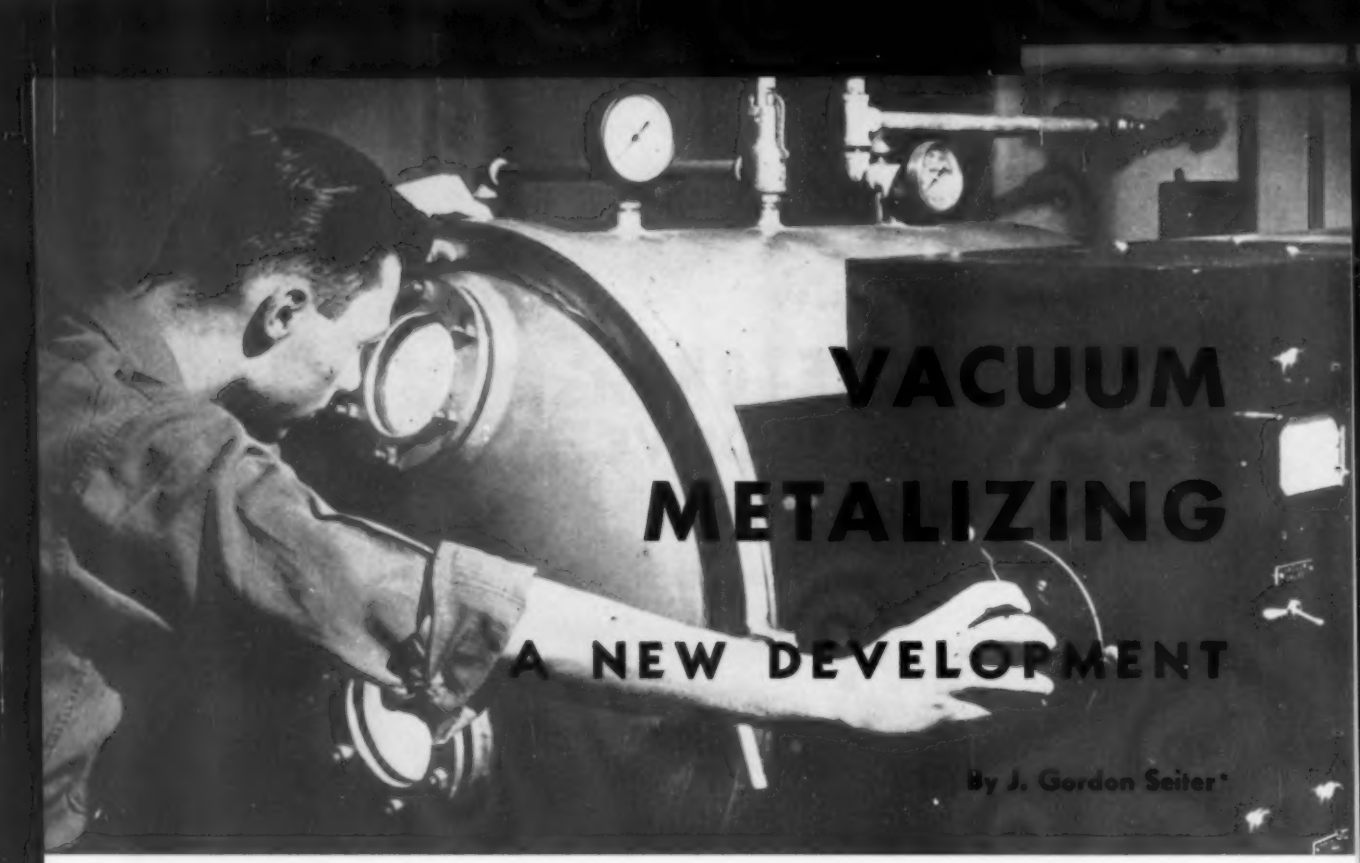

VACUUM METALIZING

A NEW DEVELOPMENT

By J. Gordon Seiter*

Until a year or two ago, vacuum metallizing—the process of applying a thin metal coating to the surface of any base material by evaporation and condensation in a vacuum—was generally regarded only as a means of obtaining an inexpensive decorative finish in applications where not too great wear-resistance was required—such as plastic toys, costume jewelry, and novelties like Christmas tree ornaments.

Today, however, thanks to the development of new and more durable lacquers for protecting the vacuum-plated finish, the process is being applied to a steadily growing number of products where good abrasion resistance is called for—such as automotive hardware, drawer pulls, and plumbing fixtures. Recently developed synthetic resins and Epon lacquers provide tough, durable coverings which will withstand as much as 500 hours of exposure to salt spray and 1000 hours of humidity without any sign of deterioration. And the automotive industry has recently conducted a series of tests which demonstrated that a standard Taber abraser, with a CS-10 wheel and a 500 gram weight, will wear through copper-chrome plating before it will wear through a vacuum metallized film that has been properly protected with one of the new synthetic resins.

These developments, plus the tremendous cost savings that can be realized by the use of the process, have brought vacuum metallizing out of the "novelty" stage. It is now an established industrial finishing technique, and many new applications for it are being developed every day.

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Such automotive items as dome lights, door handles, dashboard and instrument panel trim, under-window panels, scuff plates on doors, tail-light and parking-light reflectors, and moulding strips are either already in production or on the verge of being produced in quantity by vacuum metallizing.

Domestic hardware such as drawer pulls and knobs for furniture and kitchen cabinets, push plates for swinging doors, and knobs, grilles and trim for radio and TV sets are among the common household items now being finished by vacuum metallizing. In a test recently conducted by a large hardware manufacturer, a vacuum-metallized door knob was placed on one side of a much used entrance to the factory. A counter on the door showed that after a period in which 150,000 openings were achieved, the vacuum-metallized knob was in excellent condition.

The lamp fixtures industry has recently discovered the possibilities of this process for producing at low cost highly polished finishes simulating brass and chrome-plating. Such parts can be vacuum metallized for a fraction of the cost of the polished electroplated pieces formerly in demand.

Appliances are another field where the potential applications for vacuum metallizing are tremendous. Vacuum cleaner parts, for example, are being successfully metallized by this process, an application which has been made feasible by the development of synthetic resins for more durable protective coatings. The 1955 line of Kelvinator refrigerators utilizes vacuum metallizing in making the doors to cheese and butter compartments, as well as

nameplates and the familiar "helmeted knight" medallions.

In industrial components, the range of applications is virtually limitless.

In electrical parts, vacuum-plated coatings can contribute conductance, shielding, resistance, and other desirable properties. A thin coating of aluminum can be deposited on condenser paper, and the latter then impregnated with oil or wax, to make capacitors. Such units are smaller than those made of paper and foil, and have the additional advantage of being self-sealing. Metallized silver coatings have also been used for mica capacitors.

The evaporation of selenium barrier layers and counter electrodes onto nickel-plated aluminum sheets provides a new method of fabricating selenium rectifiers which provides longer life, greater stability, and less reverse current.[1]

Television picture-tubes can be made to give a picture that is nearly twice as bright by vacuum-aluminizing the rear surface of the screen, behind the coating of luminescent phosphors. This produces, in effect, a mirror which reflects toward the viewer the light from the glowing phosphors which would otherwise be lost within the tube. This coating is especially necessary in color-TV tubes.[2]

Nonconductive surfaces can be vacuum-plated with a thin layer of copper which can be used as the base for subsequent electroplating operations to build up a heavy layer of metal. This technique has been applied to the production of printed circuits. Phonograph record "masters" are another application of this process, the wax pattern being metallized and then electroplated. The success of operations like this arises out of the extreme thinness of the metal coating deposited and the absolute fidelity with which it reproduces the pattern of the original surface.

Vacuum coating techniques were first employed to provide low reflectivity coatings on lenses and instrument covers and found widespread application during World War II. The pilot of a plane, for instance, would often see clouds and sky reflected in the glass covers of his instruments. It was found that a thin film of magnesium fluoride evaporated on the surface cut down this reflection and permitted full visibility of the instrument dials.

On the other hand, vacuum-metallized surfaces provide excellent reflectivity. Aluminum, evaporated onto glass, produces first-surface mirrors having exceptionally accurate optical-quality reflectivity. For other products, too, such as flashlights, spotlights, and space-lighting fixtures, vacuum-metallized reflecting surfaces provide new brilliance at an attractively low cost. Reflectors stamped from metal are now usually lacquered to give a smooth surface, and then vacuum-plated, at a cost much lower than for electroplating where buffing or polishing is required.

Perhaps one of the most familiar items produced by this process is the automobile horn button or medallion. These pieces are molded of clear acrylic plastic and are metallized on the rear or second surface so that the effect, when viewed from the front, is that of a three-dimensional metallic insert. Many novel and decorative effects can be obtained by this method. For example, a multicolored metallized appearance can be given, by spraying translucent lacquers of several different colors onto the second surface of the molded plastic piece, prior to metallizing. These colors can be confined to certain limited areas by using metal masks during the spraying operation. The familiar Ford emblem, for instance, requires five separate masking-and-spraying operations before the piece is finally metallized. Each of the colors—black, red, blue, silver, and gold—must be sprayed on individually and allowed to dry before the next color can be applied. Once the piece is fully lacquered, it is vacuum metallized with aluminum—also on the second surface—and the aluminum deposits give the multi-colored lacquered surfaces the strikingly effective metallic appearance which was desired. Where no colored lacquer was applied, of course, the aluminum appears as a chromium insert.

How Vacuum Metallizing Is Done

The majority of vacuum metallizing operations are carried out in batches, but by careful planning, with one rack-load of parts loaded ready to roll into the chamber as soon as the preceding batch is finished, virtually continuous operations are possible.

The process itself is basically very simple. The parts to be coated are mounted on suitable racks and placed in a vacuum chamber. This may be either horizontal or vertical, but the horizontal chamber seems to be preferred since it permits the load to be rolled in and out more easily. The chambers vary in size from 30 inches to 72 inches in diameter and are usually 60 inches long.

The door to the chamber is closed and the cycle is started. The large capacity vacuum pumping systems with which these units are equipped make it possible to evacuate the chamber to the required pressure of 0.5 micron in a relatively few minutes—from 7 to 20 minutes, depending on the nature of the products being finished.

When the required pressure has been reached, the coating metal (usually aluminum) is melted and vaporized by resistance heating. As the metal vaporizes, the molecules take flight and travel through the vacuum at high speed until they strike and condense on the surface of the parts which are exposed to them.

Characteristically, these molecules travel only in straight lines. If a flat sheet were placed in the chamber with one side facing the vapor source, the side opposite the vapor source would not be coated unless the sheet was rotated during the time the metal was evaporating. This "one-side coating" method is usually employed to metallize mirrors, reflectors, selenium rectifiers, and automobile horn buttons and medallions.

When it is necessary to coat all sides of the object, such as toys, jewelry, hardware etc., the piece or pieces must be rotated within the vacuum chamber similar to a chicken on a barbecue spit. In this way, all surfaces are

[1] Westinghouse Electric Corporation uses several Stokes vacuum metallizers for this purpose at its Motor and Control Division in Buffalo, N. Y.

[2] RCA has installed at its tube-making plant in Marion, Ind., special Stokes-built equipment for aluminizing these picture tubes on a continuous, almost completely automatic basis.

exposed to the vapor source and will become completely coated. This rotation is achieved by means of a driveshaft with a high vacuum rotary seal extending through the end of the chamber and driven by a motor which is mounted externally.

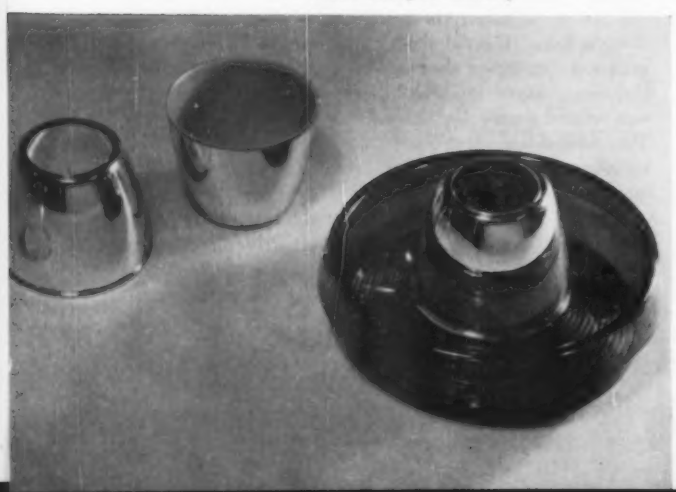
The metal that is usually deposited is aluminum, due to the fact that it is the cheapest metal to use and can be most easily evaporated. Tungsten filaments, similar to the filaments in the conventional electric light bulb, although somewhat heavier, are used to hold small aluminum wire staples. This aluminum wire measures approximately 0.060 inches in diameter, and the staples are about ½ inch long. The staples are hung on the tungsten filaments, and when the proper vacuum has been obtained, current is passed through the filaments which glow to a white heat and cause the aluminum to melt and run up on to the filaments, wetting the entire surface. As the heat is further advanced, the aluminum evaporates and coats all of the parts within the chamber. The temperature of the filament at the evaporation point of aluminum is approximately 1800° C.

Unfortunately, aluminum and a few aluminum alloys are the only metals which will wet a tungsten filament properly. If a gold, copper, or silver staple were used instead of aluminum, the staple would melt in half and drop to the bottom of the chamber without wetting the tungsten filament or evaporating sufficiently to coat the objects within the chamber. This presents a problem when it is desirable to use a metal other than aluminum. In printed circuitry, for instance, it is desirable to evaporate a thin film of copper on a phenolic sheet and then, by electroplating, build up a desired thickness of approximately 0.003 inch. Since it is difficult to electroplate on aluminum, copper is generally used as the base metal.

It is not practical to deposit any appreciable thickness of metal—such as copper, aluminum, etc. These metals evaporate rather slowly so that the deposited film is only in the order of 5 millionths of an inch after the normal flashing period. With some metals such as selenium or lead, it is possible to deposit as much as 0.003 inch in 10 or 15 minutes.

As mentioned above, copper cannot be evaporated from staples hung from filaments. In order to evaporate copper, it is necessary to form a "V" shaped "boat" or trough from 0.005 inch molybdenum sheet and, by crimping the ends together and fastening them between the electrodes or filament holders in the chamber, current can be passed through the molybdenum sheet and make the "boat" incandescent. In this way, small pellets of pure copper, gold, or silver can be placed within and evaporated from the molybdenum trough. These boats are usually about four or five inches long and approximately ¼ inch to ⅜ inch deep by ⅝ inch wide.

A Plastic Taillight Assembly



This method, however, has one limitation. As mentioned previously, the molecules of metal vapor travel only in a straight line from the vapor source. Therefore, when a molybdenum boat is used, the metal will vaporize only in an upward direction. Objects mounted beneath the boat will not be coated. In order to accomplish the coating of all objects and to utilize every available bit of space within the chamber, it is necessary to mount the parts on rotating fixtures and then, by a planetary gear system, revolve all of the fixtures within the chamber so that each set of racks will eventually come above the vapor source and rotate there.

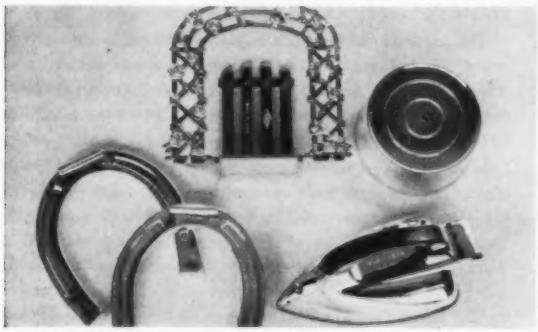
The vaporization of the aluminum during the normal vacuum metallizing process takes only about 10 or 15 seconds. Most of the time involved in a production cycle is required to obtain the proper vacuum in the chamber so that the flight of the metal vapors from the molten source will not be impeded by the few remaining air molecules.

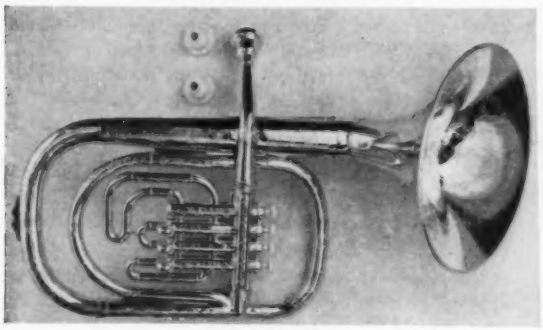
As can be seen from the foregoing description, vacuum metallizing is an extremely simple process. No skilled labor is required. No buffing and polishing operations are necessary after plating to achieve a glossy surface, provided that the surface which has been vapor-coated was properly prepared. Here is where vacuum metallizing makes possible large savings in finishing costs as compared to electroplating.

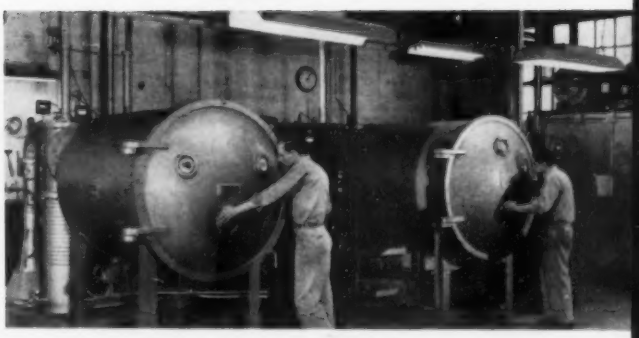
Proper Lacquering Techniques Hold Key to Quality of Finish

Due to the fact that the aluminum film is so very thin, in the order of 5 millionths of an inch, it exactly reproduces the surface on which it is deposited. Therefore, in order to achieve a simulated polished surface, a coating of lacquer or synthetic resin must be applied to the surface of the item being metallized. This lacquer coating actually serves two functions: It serves as a sealer to prevent outgassing of plastic items, and it also provides a glossy surface which will fill in minor mold defects on the surface of plastic parts, zinc die castings, or steel stampings. The application of this lacquer film represents the greatest problem. It is necessary to achieve an almost perfect lacquer coating in order to obtain the best results. There can be no runs, orange peel, sags, dry areas, etc.

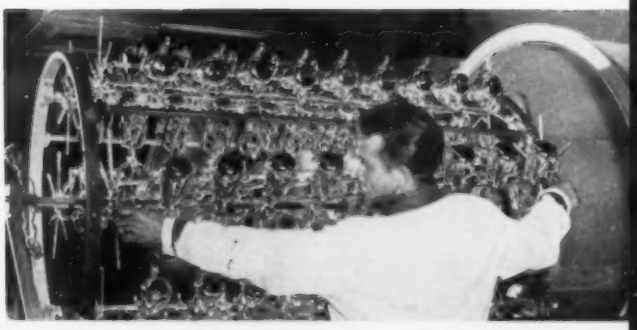
There are three general techniques in wide use today for lacquering. The first method is the conventional spray method which may be either by hand or by electrostatic application. Hand spraying requires the development of considerable skill and technique in order to achieve the



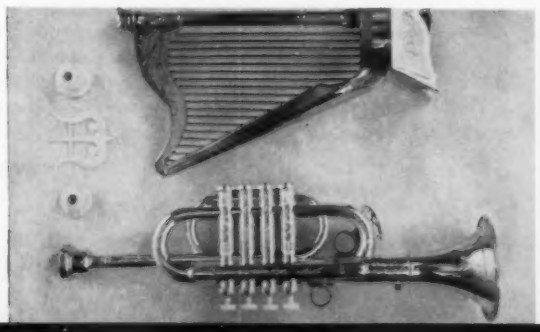


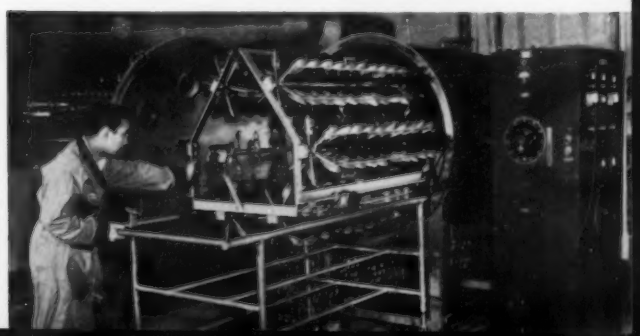


Some of the wide variety of products produced by vacuum metallizing include, toys and novelties, children's musical instruments, and Christmas Tree ornaments

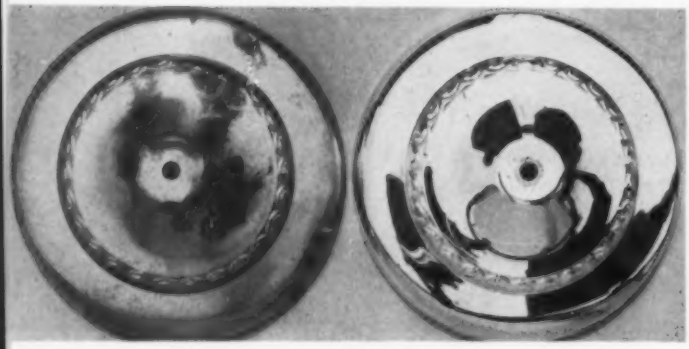


Among vacuum metallizing units showing charging, loading, unloading and operation in units ranging from 48 in. to 72 in.

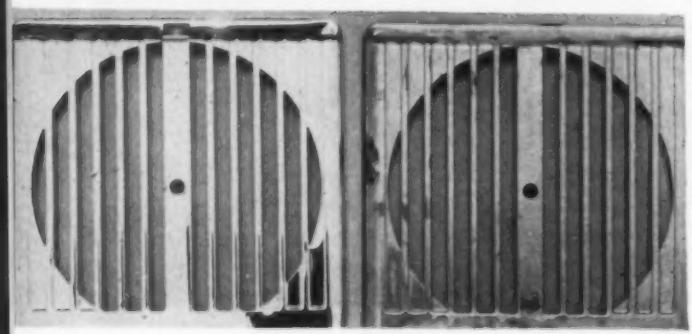




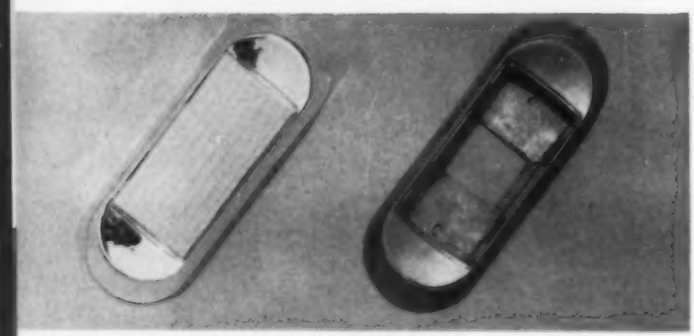
Lamp Parts



Lamp Base



Fan Grille



Dome Light

Drawer Pulls

desired result. Electrostatic spraying is excellent in many applications although there are certain disadvantages if the shape of the piece is such that the lacquer will not reach all surfaces.

A second method of lacquering is by dipping. This may be accomplished either by slowly withdrawing the parts from the lacquer tank in order to eliminate runs or by withdrawing the parts rather rapidly and removing the excess lacquer by spinning and then allowing the parts to rotate slowly to even out any runs.

Either of these methods requires a considerable investment in lacquers, and it is generally recommended that the lacquers be filtered on a continuous basis in order to remove foreign particles which may lodge on the final film.

The third and most popular method is known as flow-coating. The parts to be metallized are first mounted on the appropriate racks, commonly referred to as "spiders," which are then mounted in a horizontal tank containing two or three gallons of lacquer. The lacquer itself is pumped by a positive-displacement gear pump through a filter which delivers clean lacquer to a manifold mounted in the lid of the flow-coating tank and containing several spray nozzles located above the spider. The spider is slowly rotated while the clean lacquer cascades over the parts to be coated. After the parts are thoroughly washed with the filtered lacquer, the motor is shut off and the spider is revolved sometimes slowly and sometimes rapidly to remove excess lacquer. The entire spider is then transferred to a rotator which revolves the spider at approximately 8 to 10 rpm for a ten or fifteen minute air-dry. This rotation evens out any lacquer runs and provides a smooth glossy base coat of lacquer which will receive the metal which is vaporized in the vacuum chamber.

The base coat of lacquer must then be baked for an appropriate time, depending upon the material used. For most plastics, the baking time is in the order of 1½ hours at a temperature of approximately 150° F. The protective top coat of lacquer, which is applied after metallizing, is either air-dried or given a quick bake of 10 to 15 minutes at 150° F. For metal products, the base coat is usually baked for ½ hour at 300° F, and the top coat receives a similar treatment.

After the top coat of lacquer has been applied and baked, the appearance of the finished zinc die casting, steel stamping, or plastic part is similar to polished chrome plating. It is then possible to dye the top coat of lacquer in a water-soluble dye to achieve any desired metallic effect. Simulated copper, gold, bronze, brass and other finishes can all be achieved quite readily with a few seconds immersion in the dye dip tank. After dyeing, the parts, still mounted on the original spider, are rinsed in water and then in a mild detergent to eliminate water

spots and are then again placed in the baking oven. This "sets" the color and provides a more color-fast finish.

Equipment Required

Vacuum metallizing units are available ranging in price from approximately $12,000 to $30,000 to meet different production requirements. Baking ovens, lacquering equipment, trucks, racks, and jigging fixtures represent an additional investment ranging from $5,000 to $10,000. Thus, an investment of from $17,000 to $40,000 represents the capital outlay for a complete set-up for vacuum metallizing, depending on the size of the unit and the anticipated volume. More complicated systems can be utilized, involving automatic conveyors, infra-red ovens, automatic spray equipment, etc., depending upon the amount of automation and the volume of production desired.

Floor space requirements vary from 2500 square feet to 5000 square feet for the most efficient operation.

Production Cost

Due to the fact that the entire vacuum metallizing process utilizes unskilled labor, finishing costs represent a considerable saving over the costs generally experienced in electroplating, where hand buffing and polishing operations are required. Unskilled labor is used throughout the entire process with the result that highly paid "technicians" are not required. Operators of the metallizing unit itself can be obtained at a wage-rate of approximately $2.00 an hour and the operation of the unit can be learned within a day or two.

The material used throughout the process is also quite reasonable. For instance, about 10¢ worth of aluminum wire is used during each evaporation. This quantity of aluminum will coat 5,000 pieces of costume jewelry. Tungsten filaments cost about $8 per set and eight to ten "shots" are easily obtained from each set of filaments. The lacquer usually averages out to 25¢ or 30¢ per spider. As a result, the over-all cost of finishing the total load (six spiders full of parts) is in the order of $2.00 to $3.00 for all material. The main cost of the entire process is the labor required for racking the pieces, and the amount of labor is a function of the size of the piece and the number of parts which can be loaded within the chamber for a given cycle.

Advantages of Vacuum Metallizing

The principal advantage of the vacuum metallizing process centers around the low cost. Where highly polished chromium, nickel, brass, or other metallic plated finishes are required, vacuum metallizing fills the bill without the need for the usual hand buffing and polishing operations. Admittedly, it is difficult to obtain "color toning" due to the fact that the lacquer film presents a smooth glossy surface over the entire area and thus toning cannot readily be achieved. The nearest approach to color toning would require a single wipe of a cloth on the aluminized film immediately after evaporation. This will provide a toning effect which, when covered with the top coat of lacquer, will very nearly simulate the effects achieved by the hand toning operations associated with some electroplated finishes.

The versatility of the vacuum metallizing process is of extreme interest. Racking arrangements can be devised which make the mounting of the parts extremely simple. The flow-coating method of lacquering is applicable to practically any shaped piece. There are no apparent limitations to the process with respect to complex shapes, etc., which present serious problems to electroplaters.

The vacuum metallizing process presents unlimited possibilities with color finishes. The top coating of the lacquer can be pigmented to simulate gold, brass, copper, etc. Many other colors of the spectrum are possible by the "dye dip" method described above. The main objection to this dyeing method is the fact that, as yet, absolute color fastness has not been achieved. After a period of several months' exposure to direct sunlight, a piece which has been so dyed will fade. This difficulty is not encountered if pigmented top lacquers are used in the application of the top coat. However, care must be exercised in applying pigmented lacquers due to the fact that recessed areas in the piece are likely to accumulate a heavier coating of lacquer than the smoother areas, and this will result in a color differential which may be objectionable.

Limitations of the Vacuum Metallizing Process

It must be understood that no claim is made that vacuum metallizing will ever replace electroplating. There are many applications where vacuum metallizing does not fit into the picture. These applications center around products which require extreme resistance to impact and abrasion. It does not seem logical, at the present stage of development, that bumpers on cars will ever be vacuum metallized, for instance. While the coatings of lacquer are tough and durable, they can be gouged with a sharp edge and chipped by severe impact.

On the other hand, the horizon of vacuum metallizing applications appears to be almost unlimited. New applications are being developed every day and progressive manufacturers and processors are finding it well worth their while to investigate this low-cost plating process.

J. Gordon Seiter is 43 years old; a mechanical engineer having graduated from Drexel Institute of Technology in Philadelphia, Pa. He is presently manager, High Vacuum Division, F. J. Stokes Machine Co. Previous to joining Stokes, he was general manager of the George E. Fredricks Co. of Bethayres, Pa. He is the author of a booklet on vacuum measurement entitled "Much Ado About Nothing."

GOVERNMENT SPECIFICATIONS

By Sherman F. Booth

National Bureau of Standards

INTRODUCTION

Specifications serve a vital function in the electroplating and metal finishing industries. They protect the consumer by guaranteeing a product of the desired uniform quality. They protect the producer against unfair competition. Today, all work for Government agencies and a large part of the work for industry is done according to specifications.

Specifications have evolved slowly over the years to their present high state of development. Moreover, revisions and improvements are ever being made to:

(a) meet the requirements of new industrial developments

(b) utilize new plating and finishing processes and products, and to

(c) evaluate more precisely the basic factors which affect the quality of coatings and finishes

PLATING will give increased coverage to finishing specifications and report changes in the specifications whenever made. Particular attention at first will be paid to the specifications of the Government services, the American Society of Testing Materials and the Society of Automotive Engineers.

Contributions will be made by authorities in the field and will be published periodically when available.

SAMUEL HEIMAN
Chairman, Educational Committee, AES

It has been said that the American Expeditionary Force in World War I was not completely equipped, and that it depended upon French materiel to a large degree. The reasons given, in some circles, are because American industry was not geared to large scale production techniques and that we had only a small number of specifications with which to buy and make the items of war that were needed.

Immediately after World War I, there arose a greater consciousness of purchase specifications and standard test methods and practices. Small specifications and standardization units sprang up throughout government agencies. The various professional and technical societies also became active in this movement in their own fields. The American Standards Association was created, and the integration of the accomplishments of each of these groups with the activities of the others was undertaken where desirable. Thus when America entered World War II, it had a substantial library of widely accepted specifications and standards upon which to lean for a faster and more superior mobilization. However, in World War II, we were pressed into another type of war—with machines, techniques and philosophies quite different from previous experiences. And while we enjoyed a far better industrial potential and know-how, there were many problems to be solved in the fields of specifications and standards.

Thirty-five years of formal specification writing have now gone by during which time we have developed a library of some 30,000 widely accepted specifications for commodities of all kinds ranging from the most commonplace, to the most unusual. All government and civilian standardization agencies have had a part in this work—not the least of which is the American Electroplaters' Society. The society has taken a leading standardization role in the plating field and its efforts are reflected in the specifications and other documents of many agencies—government and civilian alike.

Many of its members are spread out through the various research organizations, professional and technical standardization societies and industrial groups working intensively to develop better materials and better techniques with which to fashion products for peace and war which

will more adequately withstand the rigors of the service for which they are intended. The result of these efforts is frequently climaxed with the presentation of a technical paper or other documentation. So that the benefits of these new developments may be enjoyed by the user, they are immediately recognized by specifications and standardization groups, incorporated in subsequent purchase specifications where appropriate, and adopted as standard materials, practices, or techniques. Many skilled technicians and many hours of experimentation are necessary to keep abreast of the fast industrial pace which America has set for herself. And it is the degree of success achieved in this effort, coupled with America's industrial potential which determine her strength and which promote the enjoyment of peace in an economy of more luxurious living for her people.

In many undertakings nowadays—most significant of which is national mobilization—almost every activity has its beginning with standards or specifications. It is unwise to undertake the manufacture of a new product without first examining the existing standards or specifications to determine what has already been done toward providing a better product, a better approach, or a better technique. This philosophy seems incontestable. It is recognized far and wide in the many industries, in the government and in the research laboratories. There would be little point in re-doing that which has already been done. However, it was the writer's experience during the early days of World War II that standards and specifications were not well known to many government contractors even though they had accepted contracts based on such specifications and standards. Their representatives were sent to Washington in frantic efforts to learn what the problem was all about. Ultimately, many of the professional societies and trade associations sensed the dilemma in which their members found themselves and they took steps through periodicals and house organs to assist in alleviating the situation. However, much of this confusion still obtains.

Nowadays, small and big business are more conscious of the importance and requirements of nationally known specifications. They know that if they are to compete for this business they must be aware of the specifications requirements and they must be in a position to deliver products that conform thereto.

Formal specifications should contain clear cut requirements. They should also include (1) the methods by which the product shall be tested in order to determine its acceptability, (2) a plan by the use of which samples are selected for testing, (3) inspection procedures which are based on a knowledge and use of the product, and (4) packaging, packing, marking, and other shipping instructions.

In the plating field there are many government specifications which should attract the attention of electroplaters. Also, it is not unusual for electroplaters to be asked to submit a bid on work involving a particular government specification. These specifications often present problems to those who are uninitiated in the whereabouts and procedure for obtaining these specifications. Actually, this is a single problem and its solution is not simple because there is no single source from which all government specifications might be obtained. There seems to be no pressing need for such an expensive arrangement. However, there are three agencies in Washington, D. C., that have a major interest in government specifications and who are in a position to direct any inquiry for specifications to the proper source. They are:

Standards Division, Federal Supply Service,
General Services Administration, Washington 25, D. C.
Office, Assistant Secretary of Defense, Supply and
Logistics, Washington 25, D. C.
National Bureau of Standards,
Washington 25, D. C.

In the Federal Government at the present time, there are two general categories of widely used specifications. They are (1) "Federal Specifications," and (2) "Military Specifications." Federal Specifications are developed and used by all agencies of the government including the military (Department of Defense). Military Specifications are developed by the Department of Defense and they are only infrequently used by the civilian establishments. These two categories of specifications are differentiated one from the other by identifying symbols.

MILITARY SPECIFICATIONS

Military Specifications, for the most part, have identifying symbols such as "MIL-P-6871." Invariably, the symbol begins with the abbreviation "MIL" for military. The second part of the symbol is always a single capital letter. This letter is always the same as the first letter of the title of the specification; for example, Plating. The third part of the symbol is a number from 1 to 5 digits and it has no significance outside of the military agencies. In this particular case, "MIL-P-6871" is the symbol for a Military Specification for "Plating, Chromium." The total symbol is sometimes followed by a capital letter. If the letter is "A" that means that the original specification has been revised and that the original specification has been superseded thereby. The letter "B" would mean that edition "A" had been revised and superseded thereby, and so on. Symbols of Military Specifications might also appear as follows: For example, "MIL-P-6871B(2)." The figure "2" in parenthesis means that Amendment No. 2 has been issued and forms a part of the current specification. Any number of amendments may be issued but in all cases (except No. 1) the last issued amendment supersedes its predecessor. However, if a specification with one or more amendments is revised, the symbol takes on the next higher letter in the alphabet and all amendments to the previous edition are automatically cancelled. Thus, in manufacturing or supplying commodities on contracts based on Military Specifications it is extremely important to be certain that, (1) the basic symbol is correct, (2) the revision letter (if any) is correct, and (3) the amendment number (if any) is correct.

FEDERAL SPECIFICATIONS

Federal Specifications constitute a much smaller total group of specifications than Military Specifications. For the most part, they concern basic products and commodities that civilian and military establishments would each be likely to buy and use. Federal Specifications are widely used, not only by Federal Government agencies but also, to a considerable degree, by purchasing offices of state, county and city governments. They are widely used as well by purchasers who buy for large firms, public utilities, etc. The symbol which identifies a Federal Specification is quite different from any other symboling system used. It, too, is a three part symbol. However, each part is significant, although the meaning of each part is of small use to other than Federal Government people. The three symbols which follow are characteristic of symbols given to identify Federal Specifications and they have the following meaning:

O-S-61	Salts; nickel (for electroplating and electrotyping.)
QQ-N-290	Nickel plating (electrodeposited).
GGG-W-301a	Wheels; buffing and polishing.

The first part, as shown above, can be either one, two, or three capital letters. This part of the symbol represents a particular class or category of materials. For example, all Federal Specifications having symbols beginning with "O" are for chemicals. "QQ" is for metals; "GGG" is for tools. The second part of the symbol is a single capital letter representing the first letter of the title of the specification; for example, "S" is for salts. The third part of the symbol is a two or three digit number which is determined by the alphabetic placement of the successive letters in the title. This part of the symbol is frequently followed by a lower case letter such as "a," "b," "c," etc. These letters indicate that the original specification has been revised once (a), twice (b), thrice (c), and that the preceding edition is automatically cancelled. Also, the third part of the symbol is frequently followed by a number in parenthesis. This number means that one (1), two (2), three (3), etc., amendments have been issued. It also means that earlier amendments are automatically superseded by later ones. As stated above in connection with Military Specifications, it is extremely important to be certain that the edition of the specification at hand is the exact one specified in the invitation for bids or the order. In some cases, an amended or revised edition describes material which is quite different from its predecessor.

SOURCES

Federal Specifications are available to bidders from the various regional offices of the General Services Administration throughout the country. These offices are as follows:

Region 1:
Room 620, Post Office and Courthouse,
Boston 9, Mass.

Region 2:
250 Hudson Street
New York 13, N. Y.

Region 3:
Business Service Center, General Services Administration
Regional Office Building, 7th and D Sts., S. W.
Washington 25, D. C.

Region 4:
Peachtree-Seventh Building
50 Seventh Street, N. E.
Atlanta 5, Ga.

Region 5:
Room 575, U. S. Courthouse,
219 South Clark Street
Chicago 4, Ill.

Region 6:
Room 1800, Federal Office Building,
911 Walnut Street
Kansas City 6, Mo.

Region 7:
1114 Commerce Street
Dallas 2, Texas

Region 8:
Building 41, Denver Federal Center,
Denver 1, Colo.

Region 9:
49 Fourth Street
San Francisco 3, Calif.

Branch Office:
Western Pacific Building
1031 S. Broadway
Los Angeles 15, Calif.

Region 10:
Federal Office Building, 909 First Avenue
Seattle 4, Wash.

Unless these offices are close by, it would be better to write to the Washington, D. C. office. Customarily, Federal Specifications are sold by this agency. For a list of all Federal Specifications, an "Index of Federal Specifications and Standards" is available. It may be obtained by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The cost is $1.75. Information with respect to the requirements of Federal Specifications should be obtained from: Standards Division, Federal Supply Service, General Services Administration, Washington 25, D. C.

Military Specifications and Standards are available from many agencies of the Department of Defense. However, all Military Specifications are not available from all of these agencies. In the simplest case, all Military Specifications *used by* the Department of the Air Force are available from a single agency in the Air Force. It is: Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, Attention: MCSIFD4. It should be noted that many, but not all, of these specifi-

cations are also used by and are available from various other military agencies. An "Index of Specifications and Related Publications (Used by) U. S. Air Force, Military Index, Vol. IV," is sold at $2.50 per copy by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

A great many of the military and other specifications and standards used by the Department of the Navy are available centrally from the U. S. Naval Purchasing Office, Bureau of Supplies and Accounts, Department of the Navy, Washington 25, D. C. In certain unusual cases where this is not true, requests will be appropriately referred. The "Index of Specifications and Standards (Used By) Department of the Navy, Military Index, Vol. III," is available by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The cost is $2.50 per copy. As in the case of the Air Force, many specifications used by the Navy are also used by the Air Force and the Army.

Specifications and standards used by the Army are not available from a single source in the Department of the Army. Several agencies of the Army control the distribution of these specifications depending upon which agency uses them. The following list shows the principal sources:

Chemical Corps Specifications:
Commanding General
Chemical Corps Materiel Command
Attn: Industrial Division
200 West Baltimore Street
Baltimore 1, Md.

Corps of Engineers Specifications:
Chief of Engineers
Department of the Army
Attn: ENGHP
Washington 25, D. C.

Army Medical Service Specifications:
Chief, Armed Services Medical
Procurement Agency, Attn:
Developing Engineers & Standards
Division, Fort Totten 59, N. Y.

Ordnance Corps Specifications:
Commanding General
Aberdeen Proving Ground
Attn: Ordnance Depot, Building 451
Aberdeen, Md.

Quartermaster Corps Specifications:
Commanding General
Philadelphia Quartermaster Depot
2800 South 20th Street
Philadelphia 45, Pa.

Signal Corps Specifications:
Commanding Officer
Signal Corps Supply Agency
225 South 18th Street
Philadelphia 3, Pa.

Transportation Corps:
Commanding Officer
Transportation Materiel Command
Marietta, Pa.

An "Index of Specifications and Standards (Used By) Department of the Army, Military Index, Vol. II," is available by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. The cost is $2.50 per copy.

Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring agency awarding the contract or as directed by the contracting officer. However, complete files of specifications will not be furnished by the military departments to non-military activities.

When the Department of Defense began converting the specifications of its many agencies to "MIL" designations, there were many different systems of symbols in use. Since not all of these older specifications have at this time been converted, there are a few of these specifications still in use. Moreover, there are other government specifications which are used rather frequently. However, only a very small portion of them concern electroplating. These specifications are known as "departmental" specifications. The reason is because they cover items which only a particular government department buys. These specifications are identified with such departments and establishments as the Post Office, Veterans' Administration, Civil Aeronautics Administration, Weather Bureau, Maritime Administration, etc. Each of these organizations has its own symboling system for the specifications which each develops. To go further into this phase of the subject would require many pages of explanatory matter which does not appear to be warranted. Whenever these puzzling symbols arise or specifications are needed for which the source is unknown, it would be easier to write for information to any of the sources shown above.

From time to time the expression "Interim" Federal Specification so and so or "Interim" Military Specification so and so will be heard. Such specifications are not numerous and they are intended as temporary documents to meet immediate procurement needs. Ultimately, they would be expected to be coordinated to the full status of a Federal or Military Specification. Interim specifications are available in the same way as their Federal or Military counterparts.

Sherman F. Booth attended schools in New York City and Washington, D. C. He was engaged in writing and interpreting construction, commodity, and equipment specifications and standards since 1920 and served two years in U. S. Army during World War I.

Booth was associated with a firm of General Contractors in New York City for 20 years. He also assisted in the administration and approval of the purchase of millions of dollars worth of equipment under Federal grants. Booth served as chief of the certification section, Division of Codes and Specifications, National Bureau of Standards, and was appointed consultant to the director, National Bureau of Standards, on Federal Specifications. He is presently serving as Technical Standards Coordinator, National Bureau of Standards.

Plating Wastes and Stream Pollution

Theodore F. Wisniewski*

A review of the literature reveals that much has been written about control and treatment of plating-room wastes but that only a few writers have concerned themselves with the problems created when such wastes, carrying excessive concentrations of toxic materials, are discharged to streams or municipal treatment plants.

Sudden death of fishes, fish-food organisms, and other forms of aquatic life is a typical result of stream pollution caused by toxic wastes. There is only one way in which such destruction can be eliminated, and that is by preventing the discharge of toxic concentrations of wastes to streams. That is why the Committee on Water Pollution requires that the concentration of toxic substances in the wastes, as discharged, be reduced to less than the lethal limit for fish or aquatic life.

Plating-room wastes have actually caused destruction of aquatic life in Wisconsin streams in several instances. These same wastes have at times interfered with operation of sewage treatment plants with resultant adverse effect on streams.

It is hoped that by citing actual cases it will be possible to bring out the importance of proper handling of plating-room wastes.

A Wisconsin city, which recently completed a biological trickling filter type of treatment plant, found shortly after it had placed the plant in operation that the plant was producing an unsatisfactory effluent. An examination of the design basis of the plant indicated that the plant was adequate in capacity for the tributary loadings and, therefore, a study was initiated to determine the cause of low efficiency. Since a plating works was located in this city and connected to its sewers, it was suspected that excessive concentrations of copper, chromium or cyanide might be the cause.

At the plating works, a bright dip containing sulfuric and nitric acids and containing copper was dumped daily. Chromium was present in the continuous overflow from rinse tanks, and cyanides were present in minor amounts in the constant overflow from rinse tanks and in great quantity in waste cyanide baths which were dumped once a week. A test run was conducted on the day when cyanide baths were dumped. To trace movement of this waste through the treatment plant, a dye was added and samples were collected as the wastes reached various sections of the treatment plant. The waste from baths as discharged contained 13,800 ppm of cyanides which by the time it reached the treatment plant was reduced by dilution with sewage to 8.6 ppm. The primary effluent contained 2.5 ppm of cyanide, the filter effluent 1.4 ppm, and the final effluent 0.9 ppm.

A test run made on a later date when only normal overflows were reaching the treatment plant showed that the raw sewage contained 3.4 ppm of chromium, 2.6 ppm copper, 2.9 ppm zinc, 0.07 ppm lead, and 0.1 ppm cyanide.

Since it is known that concentrations in excess of 1 ppm of chromium, copper, or cyanide in the raw sewage will adversely affect biological sewage treatment processes, it was necessary to require certain operating changes at the plating plant.

As a first step, it was suggested that the overflow from the chromium rinse tanks be spread over the entire 24 hours of the day to prevent build-up of concentration in these tanks and reduce the unit concentration of chromium discharged to the sewers. A similar suggestion was made with reference to the bright dip tanks in that it was required that these tanks be drained to the sewers over a 24-hour period instead of being dumped in a short period of time. This was necessary to reduce the concentration of copper in the wastes. It was concluded that the treatment plant was capable of assimilating the cyanide contained in the normal overflows but that the plant could not absorb shock loads, due to the once weekly dumping of cyanide baths. Therefore, it was recommended that the cyanide solutions be discharged to a holding tank from which they could be discharged at a slow rate over an extended period of time. For almost a year following improvement in control of discharge, the operator of the municipal treatment plant reported no adverse effect on the treatment plant, but then one morning noticed that the sewage had a pronounced yellow color and that all of the growths on the trickling filter were destroyed. Samples collected over a 15-minute period showed chromium concentrations ranging from 84 to 136 ppm. Investigation revealed that an accident had occurred at the plating works that

*Director, Wisconsin Committee on Water Pollution.

night and that most of the contents of a chromium save-rinse tank had been siphoned to the sewer. About six months later, another accidental discharge occurred at this company's plant in that a union in a line leading from a copper cyanide bath broke and allowed the contents of the tank to drain to the treatment plant. The treatment plant operated below normal efficiency for about four days and, in addition, a heavy mortality of fish occurred below the plant on the first day due to the discharge of cyanides.

The accidental discharges occurred only because due care was not exercised within the plant and are traceable to failure in training of personnel in the importance of proper precautions and of proper maintenance of equipment.

This company at a later date installed an ion exchange unit for recovery of chromium and copper from strong wastes and rearranged its plating room to reduce loss from one dip to another by placing tanks side by side and installing drip collecting pans.

There have been no difficulties due to plating wastes for about two years at this plant, and it is hoped that the company, by maintaining adequate supervision and maintenance plus employee training, will continue to so operate its plating works as to avoid adverse effect on the municipal treatment plant and the stream into which the sewage plant effluent flows.

In another city, plating wastes which originally discharged to municipal sewers, volumetrically overloaded the sewers when production was increased causing the city to bypass the wastes to the river. The bypassed wastes contained 9.6 ppm of cyanide, 10.3 ppm of chromium, and 13.5 ppm of copper. Since the bypassed wastes also contained sewage from about 100 homes, the city required exclusion of the plating wastes from the sewer to permit continued treatment of the domestic sewage tributary to the sewer system. This was done to eliminate a health hazard due to discharge of untreated sewage. The problem of handling the toxic plating wastes still remained to be solved.

At this plant, considerable quantities of cooling water were discharged along with the plating wastes and a study was necessary to determine how to segregate the wastes for treatment with the cooling waters to be used for dilution of effluent from industrial waste treatment facilities.

About this time, an employee of the company caused some 150 gallons of a cyanide bath to be dumped to the sewer leading to the river and thousands of fish were killed. At the time of the fish mortality, river samples showed cyanide concentrations of about 2.0 ppm. A conference with company officials resulted in arrangements for ponding of wastes such as alkali cleaners, acid pickle solutions, and cyanide or chrome solutions whenever it became necessary to dump such solutions.

The company also retained a consulting engineer to study its problem and prepare plans for waste reduction and treatment. The Committee on Water Pollution cooperated with the consulting engineer in making a study of the plant wastes. In order to determine waste volume and characteristics, it was necessary to install weirs in the discharge sewers from the plant, as well as within the plant, to measure the discharge from various processes. Samples of waste were obtained over a 17-hour period of plant operation, composited proportional to waste flows, and submitted to the State Laboratory of Hygiene for analysis. It was determined during the survey that large volumes of untreated plant waste containing metal plating materials toxic to aquatic life were being discharged from the plant, and it was concluded that at periods of low stream flow, this could result in development of conditions deleterious to aquatic life below the plant outfall.

The total waste volume amounted to 410,500 gallons per day containing 15.6 pounds of cyanide, 19.5 pounds of chromium, 5.9 pounds of zinc, and 4.6 pounds of copper.

It was concluded that this plant could profit by using the following good house-keeping principles:

1. Reduce drag-out losses by providing better work drainage, sufficient save-rinse tanks and drip pans between tanks.
2. Minimize drag-in to plating baths.
3. Provide for effective rinse of plated materials by adoption of properly coated plating racks, fog sprays, and suitably designed rinse-tanks equipped for minimum overflow.
4. Require uniform racking of material to be plated.
5. Control leaks or losses from tanks through routine inspection of plating equipment.
6. Salvage weak or contaminated plating baths.
7. Provide a waste control program augmented by laboratory checks of losses.

Some of the above practices were instituted by the company to reduce losses. But, then, an accident occurred. A break in a heating coil in a zinc bath caused wastes containing some 260 pounds of sodium cyanide to be discharged to the river, and fish were again destroyed. This time the company was required to pay damages for destruction of the fish. At this time the plant had under construction facilities for treatment of cyanide wastes by chlorination. The completed treatment plant receives the first rinses from an automatic cyanide copper plating unit and automatic zinc plating bath and rinses following cyanide baths used in fixture plating. Waste flow to the treatment plant averages 35 gal/min and contains from 35 to 50 ppm of cyanide. The effluent from the treatment unit ranges from 0.1 to 0.2 ppm cyanide. Chlorine feed rate averages 200 pounds per 24 hours, and the effluent contains a chlorine residual of 20 to 30 ppm. The company maintains daily records of operation, and submits these to the committee once a month. The effluent from this plant, diluted with cooling water, discharges to a river and has not produced adverse effects in the past year.

The two cases cited above in some detail definitely show that extremely low concentrations of toxic substances from plating works have a definite adverse effect on biological life, both in streams and at biological sewage treatment plants, and that the effects are considerably more serious when plating bath or save-rinse tanks are dumped either intentionally or accidentally.

Personal observations of practices in plating plants reveal apparent lack of concern on the part of management where losses or stream pollution are involved. At one plant, it was observed that an employee who was transferring chromium plating solution from a save-rinse tank to the plating bath apparently was not properly trained in the importance of saving chromium or preventing pollution as he dumped chromium solution from the save-rinse tank to the floor after the plating bath was up to level. In another case, management did not appear to understand the purpose of drip pans between tanks as these were installed so that drainage would flow in the wrong direction. The drip pans did help to reduce loss to the floor but that is all they accomplished. They could, however, also have been used to reduce dragout loss. In another instance, acid wastes and cyanides were discharged

to the same sewer presenting the hazard of evolution of free cyanide within the plant.

Observation of such practices within plating plants makes one wonder if the management and technical personnel of the individual plants have access to the publications on in-plant control and treatment prepared with the help of the American Electroplaters' Society. It may be that they do not read the publications they receive, or possibly that the publications are not directed to the right people.

Every man responsible for plating-room management should make it a point to thoroughly read and understand the following two publications available from the Ohio River Valley Water Sanitation Commission:*

1. Plating-Room Controls for Pollution Abatement, 50c.
2. Methods for Treating Metal Finishing Wastes, $2.00.

In addition, the annual publications of the Purdue Industrial Waste Conference contain a number of articles on control and treatment of plating-room wastes and are available from Purdue University.† The Journal of the American Electroplaters' Society also at times contains articles on this subject.

The Wisconsin Committee on Water Pollution has compiled a "Selected Review of the Literature on Toxic Materials Affecting Biological Life in Streams and Sewage Treatment Processes" and uses this as a guide in determining the degree of treatment required to prevent adverse effect on waters receiving waste discharges.

This five man committee consisting of the state chief engineer, a representative of the public service commission, a representative of the conservation department, the state health officer, and the state sanitary engineer is primarily an enforcement agency. Its staff is engaged in a detailed survey of the waters of the state to determine sources of pollution and the effect of wastes on streams and in preparing detailed reports which are used as a basis for issuance of pollution abatement orders following a public hearing. Greatest progress in industrial pollution abatement has been made in those industries which have entered into cooperative programs of study of their particular wastes. In the canning industry, for example, research over a number of years has produced methods of waste disposal which have practically eliminated the discharge of wastes to streams from canning plants. Tremendous clean-up strides have been made by the pulp and paper industry through the cooperative efforts of the Committee on Water Pollution, the Pulp and Paper Industry Advisory Committee on Waste Disposal, and the Sulphite Pulp Manufacturers' Research League, Inc.

The electroplating industry may need to develop an Industry Advisory Committee at the state level in order to keep its members informed on current developments in the field of waste control and treatment. Such a committee could keep the state advised on conditions confronting the industry, and could point out difficulties and problems peculiar to a particular operation. It could advise on attainable standards for effluents from various processes, and cooperate with the state on problems requiring study. Accepted practices effective in preventing stream pollution have been developed. These practices are of no value to the industry until they are actually adopted and made a part of the production practices in every electroplating plant. Control of losses and prevention of stream pollution today must be looked upon as an important part of the production schedule, just as important as the labor and materials which go into its product and as essential to its continuance in business. No industry can survive if it continues to throw away some of its raw materials while its competitor has instituted practices effective in saving similar materials.

It is well recognized by regulatory agencies that an industry knows more about its processes of manufacture and the requirements and limitations of these than do the enforcement agents. The enforcement agencies in turn know more about stream pollution and its abatement than do most industries and are in a position to establish the safe and allowable minimum concentrations of polluting substances which may be discharged to streams. Satisfactory pollution abatement can be accomplished through the sincere and earnest cooperation of the industry in applying presently known ways and means to abate pollution, and in conducting research to determine ways of solving problems for which answers are not presently known. Some of the pollution problems of the industry may be due to existing processes which need modification or plant layout which makes control difficult. Substitution of processes may reduce the problem of treatment. Adjustments in plant layout and piping arrangement might prove helpful in controlling accidental losses. A simple change such as introduction of piping above the liquid level in tanks would certainly have prevented the fish mortality due to drainage of a tank because of a break in the pipeline connected to the tank.

Consultation with representatives of the Committee on Water Pollution will prove helpful to the industry in selection of methods of treatment to fit a given situation. Examination of sites for proposed treatment facilities and review of plans for such facilities are services that the staff of the committee performs in order to gain suitable and satisfactory installation of facilities of adequate design. When a treatment plant is installed, its effective operation is essential to the maintenance of satisfactory stream conditions. Operation of treatment plants is in some cases a strange new venture for an industry and in those cases it has been found that discussion with the committee can prove helpful in developing an operating schedule which can be maintained on a routine basis. This may involve training of the operator in the essential phases of his work and in the detection by observation or analysis of any unusual conditions which might require special adjustments.

To summarize, it must be repeated that since extremely small concentrations of toxic substances can virtually destroy the usefulness of our streams and deprive us of an important natural resource, it is important that adequate supervision, proper maintenance, adequate safeguards, and a good employee training program be utilized as an essential means of eliminating this type of pollution.

THEODORE F. WISNIEWSKI

Wisniewski

Wisniewski received his B.S. degree in chemical engineering from the University of Wisconsin in 1932.

Was employed for a short time by the Chromium Corporation of America. In 1937 joined the State Board of Health as District Public Health Engineer at Green Bay, Wisconsin. Was transferred in 1942 to the Central Staff of the State Board of Health in Madison in charge of industrial wastes and stream pollution control. In 1950 was appointed Director of the Division of Water Pollution Control.

Belongs to the ACS, APHA, FSIWA, American Academy of Arts, Sciences and Letters, Wisconsin Society of Professional Engineers, and Soil Conservation Society of America.

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Strippable Coatings for Machined Metal Parts and Tools

By Lyne S. Metcalfe

Ever since technology made possible production of machined and precisioned metal parts and products, means were sought to give protection to outer surfaces—from injury by corrosion, by humidity, by abrasion, by salt water and by ordinary rough handling.

Particularly has exposure to such hazards of *precision* parts been costly and numerous attempts have been made to give the needed protection, namely, through application of grease, oils, metal, wax paper and even wood protective coatings. In many instances these protective measures and materials have served well; but tempo and complexities involved in machining, fabricating and/or finishing of parts and products coming under these headings, has brought a demand, first, for greater protection, second, for a method which is economical and quick to apply, as well as easy to remove at the moment of use.

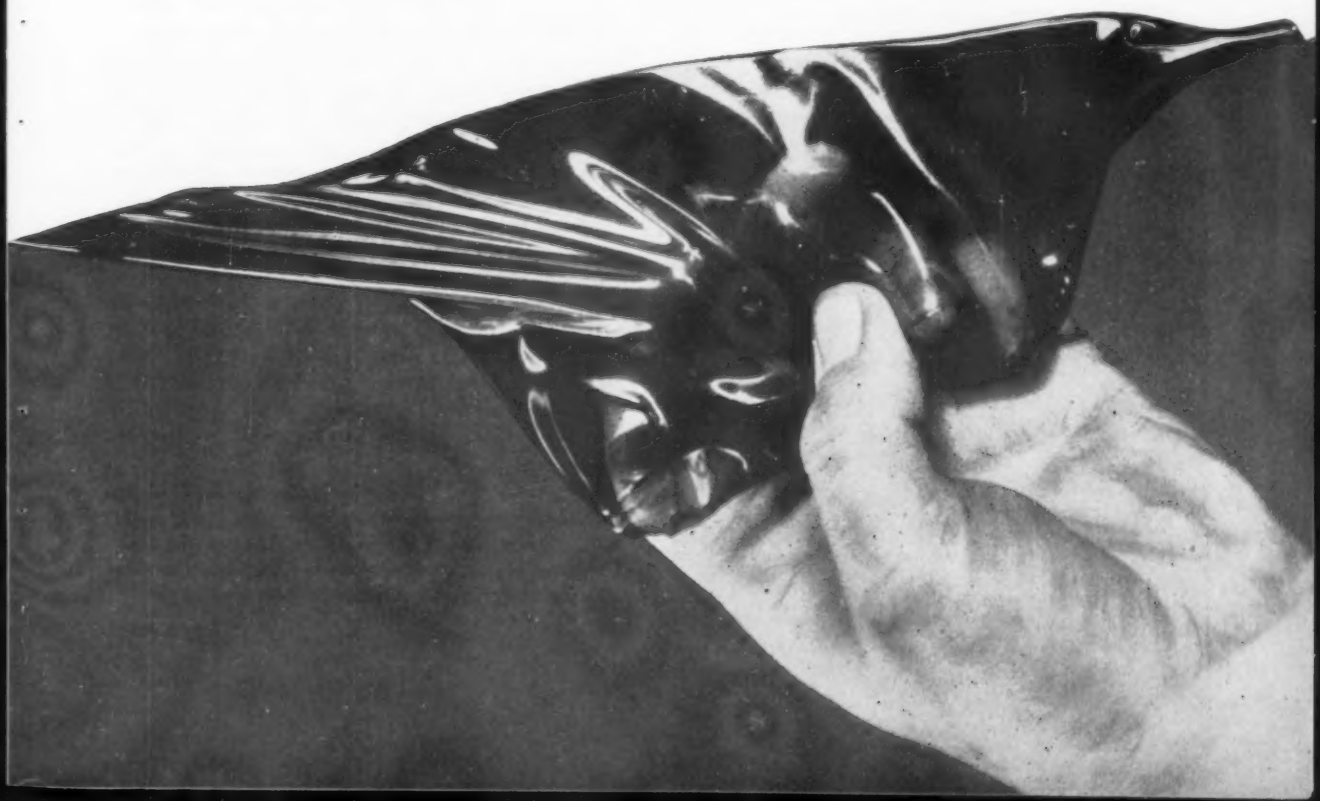
Not only is this protection needed in transit and long term storage but parts are often exposed in inter-plant handling to Chemicals and Fumes.

As a development of the fast and growing field of "packaging" materials and techniques, it is natural that something should be developed which fully meets the requirements as outlined above, and such a method is now being widely used with success in many industries and especially in the metal and machining trades.

First, as to this *material*:

The bases for these strippable plastic coatings are two well-known materials, ethyl cellulose and cellulose acetate butyrate. These basic materials are used separately to formulate a series of coatings with different characteristics for different applications.

The usable coatings themselves are compounds including ethyl cellulose or cellulose acetate butyrate, resins, plasticizers, stabilizers and anti-corrosive oils, etc. The resultant film as produced by the coatings manufacturer is from 0.05 to 0.1 of an inch thick and is transparent and pliable. This coating becomes what amounts to an integral part of the finished coated article until the latter goes into use when the coating is quickly and easily peeled



Melting tank, coated, objects, block of coating compound

Single stripping operation

Single dipping operation

or stripped off. This leaves the finished surface undamaged, ready for use, no cleaning or treatment of any kind being needed before use after the coating is stripped off.

Now, what really are these "enemies" of metal parts and products lying in wait during storage and shipment? It is probable that the degree to which they destroy the surfaces of such materials is somewhat underestimated by the average manufacturer who may feel that little damage can happen to his product between the time it leaves his plant until it is put into the final production line.

Of course, everyone knows the destructive force of corrosion and rust, and this is the chief enemy of metal parts and products—one which must be guarded against. The strippable coatings described here give protection against it, due to rust-inhibiting oils which are included in this type of parts coatings and which also give the plastic its "oil feel."

Also, the glove-tight fitting nature of the applied coating keeps out most harmful moisture, and the fact that the coating is applied at a heated stage tends to discourage the presence of moisture. It has been found after ten years of practical tests, that these coatings insure adequate protection against rust and corrosion.

The need for clean surfaces in using metal parts on any assembly job is well enough known, and another advantage of strippable coatings is that they protect the parts surfaces from any and all possible contamination.

On the other hand, materials of all types are pretty apt to be roughly handled these days even in inter-plant conveyance and this protection is another important function of the coatings.

The film over the part cushions the surface against chipping, denting or scratching. The fact is that the finest precision instrument parts have been coated and then shipped in outer coverings and found free of all surface blemishes at the end of the storage or shipping period.

Inasmuch as the curious can see every detail of the coated object through the plastic film coating, protection is assured from tampering while the parts or materials are enroute.

In the same way rough handling, effects of salt water and so on are nullified by the use of the plastic coatings.

The successful application of peelable plastic coatings depends on its intelligent use on properly prepared surfaces. As in the case with any packaging material—be it paper, wood, wax, grease, oil or metal—the nature and properties of the material must be understood and the packaging operation specifically designed with the properties of the material in mind. Wood is wood and cannot be drawn or beaded. Paper, wax, grease and metal all have their limitations. And so, of course, do the peelable plastic coatings.

The condition of the part prior to dipping is of importance because the coatings will preserve the part in the same condition as when it is dipped. It must be absolutely free of rust, cleaning compound and moisture, with only preservatives or operational lubricants present.

Experience indicates that of the various recommended cleaning methods vapor degreasing gives superior results when the parts are to be preserved in strippable plastic. Records show that where vapor degreasing, combined with finger print removal and proper drying, is a part of the standard procedure, failures due to corrosion are virtually non-existent.

Another factor which is of prime importance is the melt tank equipment. Peelable plastic is a poor conductor of heat. It begins to decompose at temperatures above 400° F. Melt tanks must, therefore, be used which are designed to eliminate any possible hot spots. Only equipment so designed and constructed that the entire surface of the inner tank acts as a heating surface should be considered.

The melt tank should be no larger than required to accept the largest part which is to be dipped. Tanks are available in a wide range of sizes starting with portable, gallon units as shown in the illustration. Because of the heat-sensitive nature of the peelable plastic coating, any given quantity of the plastic should remain at operating temperatures as short a time as possible. A large tank used in such a manner that only a small amount of plastic is withdrawn at each dip will result in the bulk of the plastic being held at operating temperatures (300°–350° F) for unduly long periods, causing premature breakdown.

A properly designed tank of a size in keeping with dipping requirements, kept at operating temperatures only during periods of use, will maintain the initial quality of the plastic for hundreds of hours.

In large tanks the molten plastic must be continuously circulated to prevent the plastic in contact with the walls from overheating. Means for introducing slabs of fresh plastic must be provided to allow for the replacing of the plastic withdrawn as parts are preserved. Air bubbles should be kept out of the dipping area. Excellent dipping tanks (specifically designed for these plastic coatings) are available commercially.

The coating operation with these materials is simple. They are applied by means of one quick dip in and out of the molten plastic. This compares favorably to the older methods of grease, oil and dunnage and wrapping paper protectives.

Inasmuch as the time and labor involved in these older methods run up the cost of parts protection, there has long been needed a method which is not only simple in itself, but also rapid in achievement. At the same time as improved machining techniques have given finer surfaces and tolerances to metal parts and products, the need for more and reliable protection to a wider and wider range of surface injury has become more acute.

On the other hand, in reverse, there has long been the need for rapid and low cost *removal* of whatever coating may be in use. Removal of wrapping, oils, greases, papers and so on is usually time consuming and may involve the use of special removal equipment and methods. With the newer plastic strippable coatings, removal before the use of the part or product is rapid and inexpensive in terms of time and labor cost.

As a matter of fact, when the part is needed for use, the coating surface or "envelope" is merely slit and then stripped rapidly off (like peeling a banana!) thus leaving the part ready for use, as clean and uninjured in surface as it was when it came from the machine. In other words there is no need to remove oil or grease by means of solvents or of unwrapping protective wrappers.

This type of coating is full transparent, one of the features of special interest. Through this negligible film the detailed surface of each coated part may be inspected without its removal. This is often necessary for inspections, in handling stock (serial number readings), and for quick identification of the item. This, too, it is said is a factor in favor of the lower cost of the utility of the plastic type coatings.

After being used this type of coating can be remelted and reused which is a great advantage in connection with inter-plant protection.

Laboratory work plus tests under usage conditions have been improving these strippable plastic coatings since 1944. New resins have been introduced in their manufacture also new plasticizers and effort has been successfully made to reduce more and more the cost of their use. The fact is that the amber-colored coatings which were the genesis of this method bear small resemblance to the clear and tough protective coatings of today.

Said D. R. Welter, of the Bischoff Chemical Company, an authority who has engaged in prolonged research in this field, to the writer:

"The hot melt protective strippable coatings available today bear little resemblance to the first such coatings developed during the last war. Today there are custom-tailored coatings designed for specific applications.

"For example; very low cost coatings for inter-plant use on tools, parts and sub-assemblies are also used for shipping or storage packaging where cost and protection are the primary concern. Then there are water-white coatings that not only give the desired protection but their crystal clarity adds great sales appeal. There are specification coatings for Army, Navy, Air Force use. In addition to the above are many hot melt compounds made to fit specific needs.

"The variety of compounds offered, the development of better melt tanks and increased stability in the compounds themselves have resulted in much better bath life and foolproof operation. The simplicity of application and economical nature of these coatings are contributing to their fast increasing use on all types of precision metal parts."

Lyne S. Metcalfe. Nationally known business writer for 20 years. Formerly with Chicago Tribune, Scripps Howard Syndicate. Author of business books, and of over 4,000 published feature articles in the Business, Industrial and Special Appeal groups.

ANALYTICAL DETERMINATION OF TRACE CONSTITUENTS IN METAL FINISHING EFFLUENTS

XIII. The Volumetric Determination of Sulfate in Effluents

E. J. SERFASS† AND R. F. MURACA*

THE FOLLOWING PAPER, THE THIRTEENTH OF A SERIES, IS A RESULT OF THE WORK SPONSORED AT LEHIGH UNIVERSITY BY THE AES AND THE OHIO RIVER VALLEY WATER SANITATION COMMISSION. WHILE THE ORIGINAL PROCEDURE WAS WORKED OUT UNDER AES SPONSORSHIP, THE MODIFICATION WAS DEVELOPED UNDER ORSANCO SPONSORSHIP, THE COMMISSION HAVING PLACED THE PROJECT AT LEHIGH SO AS TO BE ABLE TO UTILIZE THE BACKGROUND DEVELOPED BY AES PROJECT NO. 2. IT SHOULD BE NOTED THAT THE METHODS DESCRIBED IN THIS SERIES WERE TESTED, MODIFIED IF NECESSARY, AND RETESTED BY AT LEAST SIX AND SOMETIMES AS MANY AS TWELVE INDUSTRIAL LABORATORIES. AS A RESULT OF THIS, THE APPROVED FORM, AS PUBLISHED HERE, WAS DEVELOPED.

Abstract

A volumetric procedure for the determination of sulfate in effluents in the range of 5 to 50 ppm is presented.

The method makes use of a combination of hydroxide and silver ion precipitations to remove ions which might interfere with the indicator for the titration. Fluorides are removed by repeated evaporation with hydrochloric acid and organic matter, if present, is rendered innocuous by oxidation with peroxide. The titration of the sulfate content is carried out using tetrahydroxyquinone as the indicator.

When thiocyanates, phosphates, etc., are absent, the procedure can be materially shortened. A table concisely indicates the changes that can be made in the procedure when the composition of the effluent is known.

The Volumetric Determination of Sulfate in Effluents

The usual methods for the determination of sulfate in solutions make use of the formation of barium sulfate which is weighed directly or, for volumetric procedures, the amount of a standard solution of barium ions that is necessary to cause a completion of the precipitation is measured. Since for this analysis the range of 5–50 ppm of sulfate has been selected, it is obvious that a gravimetric procedure is impractical since even if a 100 ml sample would be chosen the weight of barium sulfate which would be obtained would be only 1.2 milligrams for 5 ppm. Although this amount of precipitate could be weighed with sufficient accuracy, the mechanical difficulties would be considerable and the coprecipitation effects would severely affect the precision and accuracy of the method.

The volumetric method described in "Standard Methods for the Examination of Water and Sewage" seemed to be sufficiently rapid to warrant investigation. A survey of the literature revealed that the use of tetrahydroxyquinone as an indicator had not been thoroughly investigated and so it could not be ascertained whether the presence of antimony, bismuth, tin, etc. interfered with the indicator end-point. However, it was certain that anions such as fluorides, phosphates (over 60 ppm), chromate, oxalate, etc., would also react with the standard barium solution and so render the results questionable. In particular, the presence of organic materials that might complex barium had to be borne in mind.

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Description of the Method

The sample is made acid and boiled to remove HCN, SO_2, CO_2, etc. Then, the neutralized solution is treated with silver nitrate in excess mainly to precipitate thiocyanate, phosphate, etc. Since the solution is nearly neutral, the hydrated oxides of most of the cations that are liable to interfere are also precipitated at this point. Fluorides are removed by a repeated fuming with hydrochloric acid, which also serves to cause a preliminary decomposition of organic material. The residue is then oxidized with alkaline peroxide to complete the oxidation of complexing organic substances. Then, the sulfate content is determined by titration with standard barium chloride solution using tetrahydroxyquinone as the indicator.

The method was tested on solutions containing 100 ppm of the common cations, chlorides, acetates, tartrates, oxalates, cyanides, thiocyanates, and sulfites.

Limit of Detection of the Method

The limit of detection of the method is defined as the minimum number of micrograms of sulfate ion which must be present in the 100 ml sample taken for analysis so that a difference of 0.2 ml barium chloride will be obtained between the volume used for the sample and for the blank. For the recommended procedure, the limit of detection is 100 micrograms of sulfate ion (1 ppm).

The limit of detection can be increased by taking a larger sample.

Recommended Procedure

This procedure is designed to be used for the determination of 5 to 50 ppm of sulfate in a 100 ml sample of the effluent.

Reagents Required

(1) **Hydrochloric Acid:** Concentrated, 12 *N*, reagent grade.

(2) **Sodium Hydroxide:** 20 per cent w/v; dissolve 20 g of reagent NaOH in 100 ml water.

(3) **Phenolphthalein Solution:** 1 per cent w/v; dissolve 1 g of the indicator in 100 ml of methanol.

(4) **Sodium Hydroxide:** 1 per cent w/v; dissolve 1 g of reagent NaOH in 100 ml water.

(5) **Nitric Acid:** 1:1; dilute concentrated HNO_3 with an equal volume of water.

(6) **Tetrahydroxyquinone Indicator:** Ordinary commercial salt.

(7) **Isopropyl Alcohol:** Reagent quality, 98 per cent.
(8) **Barium Chloride Solution:** 1 ml—0.5 mg sulfate. Dissolve 1.085 grams of anhydrous barium chloride and dilute to exactly one liter. The anhydrous salt is made by drying the pure dihydrate for 8 hours at 150° C.
(9) **Silver Nitrate Solution:** 2 per cent w/v; dissolve 2 g of the salt in 100 ml of water.
(10) **Perhydrol:** Use reagent grade, 30 per cent hydrogen peroxide.

Procedure

(1) Pipette a 100 ml sample of the effluent into a 250 ml Erlenmyer flask.
In running a blank, use 100 ml of water. It will be necessary to use a blank to correct for the indicator error.
(2) Add 10 drops of phenolphthalein solution.
(3) Make the sample definitely acid by the addition of 1:1 HNO_3.
(4) Boil for at least 5 minutes.
(5) Add 1 per cent NaOH solution until the indicator is pink.
(6) Add 2 per cent silver nitrate until the precipitation is complete and add 5 ml in excess.
(7) Filter the solution through Whatman's No. 40 paper, catching the solution in an evaporating dish. Do not wash the filter or the flask.
(8) If a voluminous precipitate remains in the paper, return the filter paper and its contents to the flask and add 25 ml of water and 5 ml of 1:1 nitric acid. Break up the paper and its contents with a stirring rod. Slurry the contents so as to cause as complete a dissolution as possible.
(9) Add a few drops of phenolphthalein indicator and then add 20 per cent NaOH solution until a faint pink color develops.
(10) Filter through a No. 40 Whatman's paper, catching the filtrate in the evaporating dish.
(11) Wash the filter and flask with small portions of water. Combine the filtrates and washings in the evaporating dish.
(12) Add 10 ml of concentrated HCl to the contents in the evaporating dish.
(13) Evaporate to dryness on a water bath.
(14) Add 25 ml of concentrated HCl and again evaporate to dryness.
(15) Dissolve as much of the residue as possible in about 25 ml of water, and filter it into a 150 ml beaker through a Whatman's No. 40 paper. Wash the filter paper with several portions of water. Combine the filtrate and washings.
(16) Add 5 ml of 20 per cent NaOH solution and cautiously add 2–3 ml of 30 per cent hydrogen peroxide.
(17) Heat to boiling and boil for at least 5 minutes, or until the peroxide is decomposed.
(18) Add several drops of phenolphthalein indicator and by using dilute NaOH or HCl adjust the solution until it is just colorless to the indicator.
(19) Add 25 ml of isopropyl alcohol.
(20) Add 0.20 g of tetrahydroxyquinone indicator.
(21) Titrate with the standard solution of barium chloride until the yellow color of the solution changes to red.
(22) Subtract the number of milliliters of barium chloride solution used for the blank from the number of milliliters used for the sample.
(23) Calculate the ppm of sulfate from the following: ppm of sulfate = net ml of barium chloride × 5.

Variations of the Recommended Procedure

If the composition of the effluent is known, the recommended procedure for sulfate ion can be materially shortened.

The following table summarizes the changes which can be made in the recommended procedure for sulfate ion when the composition of the sample is known. Unless otherwise stated, the concentration of other elements must not exceed 100 ppm.

Composition of Effluent	Changes in the Recommended Procedure
All metals below 5 ppm. Fluorides, thiocyanates, and phosphates absent (i.e. below 0.2 ppm) and organic matter negligible.	Pipette a 100 ml sample into an evaporating dish and evaporate to about 25 ml after acidifying with HCl using phenolphthalein indicator. Start at step 18.
All metals below 5 ppm. Fluorides absent (below 0.2 ppm); organic matter negligible; phosphates present.	Use recommended procedure up to step 11; omit steps 12, 14, 16 and 17. Time may be saved by using a 25 ml sample and cutting down all volumes prior to step 15.
Organic matter absent or negligible.	Omit steps 16 and 17.
Thiocyanates, phosphates, and borates, absent or below 0.2 ppm.	Omit step 6.
Fluorides absent.	Omit steps 12, 13 and 14. Between steps 11 and 15, evaporate to about 25 ml.

Dr. Earl J. Serfass

Dr. Ralph F. Muraca

PATENT ABSTRACTS

DR. D. GARDNER FOULKE
Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co.
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,726,179, Dec. 6, 1955—Recording Tapes Having a Metal Layer—A. Ortlieb and E. Traub, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany.

Claim 1 describes a new article of manufacture, an electrically non-conductive recording tape having a thin vapor-deposited layer from 0.02 to 0.2 m in thickness of an alloy of cadmium and zinc, containing substantially 80 per cent of cadmium.

2 claims.

—AES—

No. 2,726,175, Dec. 6, 1955—Iron Ion Control in Lead Coating Bath—F. Kendall and J. K———, assignors to Steel Ceilings, Inc., Cleveland, Ohio.

An immersion lead bath consisting of the lead salt of an aliphatic polybasic hydroxy acid operated at a pH of 4.5 to 6.5 and at a temperature of 70°F to boiling is claimed to be effective for a longer period of time if the iron, entering said bath as a result of the displacement reaction, is oxidized to the ferric condition and made ineffective by adding ammonium and alkali metal fluorides and bifluorides.

10 claims.

—AES—

No. 2,725,395, Nov. 29, 1955—Oxyalkylated Fatty Amine Salts of Trifluoric Acid—A. Chester, assignor to Poor and Co., Chicago, Ill.

The object of this invention was to provide new and useful compounds stable in strong acids, especially chromic acid solutions. The disclosure mentions that the compounds claimed increase the throwing power of chromic acid baths and provide a foam blanket thereon. The compounds claimed include salts of trifluoracetic acid and oxyalkylated fatty amines containing at least 4 oxyalkylene groups (oxyethylene, oxypropylene) in aliphatic chains of the fatty amine 8 to 60 carbons. Oxyethylated soybean amine mentioned specifically in claim 3.

—AES—

No. 2,725,353, Nov. 29, 1955—Electropolishing Metallic Articles—H. Strobel, assignor to Western Electric Co., Inc., New York, N. Y.

The article is made the anode in an aqueous bath of 18–30 per cent copper nitrate and 6–2 per cent sulfuric acid. A current density of 3000 asf is used which is claimed releases sufficient oxygen at the surface of the article to passivate with copper oxides and polish the surface beneath the oxides.

6 claims.

See also 2,725,352, 2,725,354 and 2,725,355, also assigned to Western Electric Co., covering equipment for electropolishing with 7, 10 and 7 claims respectively, as well as figures.

No. 2,725,314, Nov. 29, 1955—In-Line Treatment of Toxic Carry-over of Work Pieces—Leslie Lancy, Ellwood City, Pa.

An integrated in-line treatment of toxic wastes in general is claimed. In the disclosure, the treatment of cyanide wastes is discussed in detail. The system consists essentially of an in-line treatment tank following a save rinse to which neutralizing chemicals are supplied (chlorine for cyanide) to render the toxic material innocuous so that the following rinse may be directly fed to the sewer. A treatment solution reservoir is provided to maintain the composition of the treatment tank at a satisfactory condition.

16 claims, figure.

—AES—

No. 2,725,310, Nov. 29, 1955—Rust Inhibitive Finishes for Ferrous Metals—B. McBride, assignor to Westinghouse Elec. Corp., East Pittsburgh, Pa.

The process consists of five steps: 1.) Apply an aqueous phosphoric acid solution. 2.) Dry the applied coating with at least 100 milligrams of free phosphoric acid before drying. 3.) Coat with at least 1 mil of a primer essentially consisting of 100 parts by volume of resinous material and 80–250 parts of finely divided solid pigments, 40 per cent of which is reactive with phosphoric acid, i.e. oxides, hydroxides, etc. of zinc, lead, calcium, magnesium, manganese, iron, antimony, cadmium and aluminum. 4.) The primer is then dried and cured and finally 5.) an organic finish is applied over the primer.

7 claims.

—AES—

No. 2,724,937, Nov. 29, 1955—Buffing Wheel—George Churchill, Cohasset, Mass.

One of the objects of this invention was to provide a buffing wheel which may be made from individual strands of twisted fibers, especially sisal fibers. The buffing wheel section has radially extending buffing elements and a hub member to which the elements are secured, the elements being disconnected from each other for the major portion of their length inward, permitting the elements to individually flex during the buffing operation.

4 claims, 10 figures.

—AES—

No. 2,726,201, December 6, 1955—Anodic Pickling and Nickel Plating of Tank Interior using Single Electrotype—W. Prine, assignor to the International Nickel Company, New York, N. Y.

The process for plating the inside of tanks or large containers consists of assembling an appropriate electrode structure and suspending in the tank filled with an acid nickel plating solution with a *p*H of 1 to 4.5 containing 150–500 g/l nickel sulfate, 20–65 g/l nickel chloride and 15–45 g/l boric acid. The tank is made anodic for 15 seconds, then the current is reversed and nickel plated upon the sides thereof.

1 claim, 4 figures.

—AES—

No. 2,726,203, December 6, 1955—Method for Plating by Condenser Discharge—S. Rockafellow, assignor to Robotron Corporation, Detroit, Mich.

Claim one states: "On a process for electroplating a metal from a group consisting of copper and cadmium onto a base member the step comprising: supplying electrical energy to the plating electrodes in a series of uni-directional pulses wherein each of said pulses constitutes a portion of successive half-waves of one polarity of alternating current wave-form, each of said pulses beginning with respect to each half-wave after the high point thereof and ending at the first following point of zinc potential." Under Voltage Example 1 in the disclosure it is stated that the thickness of copper obtained in 19 seconds (160 volts and 130 asf peak) was equivalent to a 90 second deposit time in a cyanide copper bath 65 volts and 30 asf.

8 claims, 6 figures.

See also No. 2,726,202 by same patentee with 6 claims and 2 figures.

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5	10"	15"	18.00	20	18"	18"	40.00
8	12"	16"	22.00	26	18"	24"	45.00
10	12"	20"	24.00	30	18"	28"	49.00
12	12"	24"	26.00	40	18"	36"	59.00
9	10"	24"	23.00	50	18"	48"	69.00
7	9"	24"	21.00	27	22"	18"	49.00
10	16"	12"	26.00	30	22"	20"	53.00
12	16"	14"	28.00	55	22"	36"	70.00
15	16"	18"	33.00	73	22"	48"	83.00
20	16"	24"	40.00	55	28"	22"	76.00
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PATENT ABSTRACTS

No. 2,727,841, December 20, 1955—Method for Improving the Corrosion Resistance of Zinc—A. Chester, assignor to Poor and Company, Chicago, Ill.

The process consists of treating zinc surfaces with an aqueous solution of 0.5–5 per cent by weight of nitric acid, 1.82 to 9.1 g/l of chromic acid and 1.59 to 7.95 g/l of water soluble fluorine containing compound such as trifluoracetic acid, fluoboric acid or the lower alkyl esters of said acids.

9 claims.

—AES—

No. 2,728,321, December 27, 1955—Apparatus for Gas Plating—O. Davis and H. Belitz, assignors to Commonwealth Engineering Company, Dayton, Ohio.

An apparatus is described for the deposition of metal from their carbonyl compounds, eg nickel.

1 claim.

—AES—

No. 2,728,693, December 27, 1955—Method of Forming Electrical Conductor Upon an Insulating Base—E. Cado, assignor to Motorola, Inc., Chicago, Ill.

The object of this invention is to provide an improved process by means of which the resist and metallic base coatings of printed circuits may be removed easily. The steps include: applying a soluble nonconductive coating (1) over portions of base (insulating) material, applying a previous metallic coating over the surface of the insulating base at least partially covered by said nonconductive material (1), forming a soluble resist over the metallic coating (previous) upon which no conductor is to appear, plating upon the unshielded portions of the conductive coating, then dissolving off the resist, the base meterial (1) and floating off such portions of the previous metallic coating loosened thereby.

8 claims, 3 figures.

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No. 2,728,719, December 27, 1955—Reconditioning of Ferrotyping Surfaces—W. Tucker and F. Beuckman, assignors to Eastman Kodak Company, Rochester, N. Y.

This method of reconditioning a chromium plated surface comprises cleaning the surface by handrubbing with a water slurry of amorphous aluminum oxide, removing the slurry and finally applying a coating of fatty acid to the chromium plated surface. 2 claims.

—AES—

HELP! HELP!

American industry is facing long delays in obtaining patent coverage for products and processes otherwise ready for the market, according to reports made at a recent meeting of The New York Patent Law Association, which was addressed by the Commissioner of Patents.

These delays stem from the great increase in the number of patent applications filed during the past few years. This flood of inventions has stretched the average prosecution time per patent to three and a half years.

The Association points out that the Patent Examiner thus holds a key position in the advancement of American technology and that the only way to reduce these delays and clear the way for marketing the new products and processes is to employ new Patent Examiners to pass upon the backlog of applications which is piling up in almost every technical field.

Steps have already been taken in this direction and approximately 100 new Patent Examiners have been added to the examining staff since last June. It is understood that the Patent Office wants 300 new Patent Examiners in 1956; 125 in the first quarter, 25 in the second quarter, and 75 in each of the last two quarters. There are immediate openings for engineers and scientists who can accept appointments in Washington now.

Patent Examiners pass upon applications for patents in a wide range of technical fields to determine whether they are novel and whether invention is involved. This calls for a study of the issued patents and the related scientific literature. The Association points out that the technical graduates who apply will find the job both interesting and stimulating and one which keeps them in close touch with the latest technical developments. The job offers opportunities for rapid advancement within the Patent Office. Washington also offers unusual opportunities to carry on graduate studies at the same time.

Salaries for Examiners start at $4,345 a year, and it is possible to reach a salary of $7,570 in five and one half years, with salaries in excess of $13,000 available. The Patent Office also offers liberal vacations and sick leave and pension benefits.

Engineers and scientists holding a college degree in engineering or applied science, or a degree with a major in chemistry or physics, or with certain combined credits in these fields, are eligible for appointment as Patent Examiners, without examination, upon application to the Commissioner of Patents in Washington, D. C.

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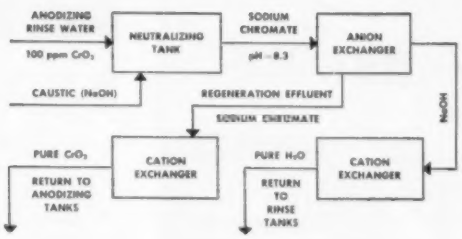

RECOVERY OF CHROMIC ACID FROM ANODIZING RINSE WATER

The block diagram above indicates one method of using ionXchange to save money, in the plating rooms of a large automobile plant, by recovering the chromic acid from the rinse tanks of anodizing operations. The cost of equipment was much less than the cost of a disposal plant, and the savings through recovery were substantial enough to make the investment a very profitable one.

REMOVAL OF ALUMINUM FROM ANODIZING BATH

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ARTICLE REFERENCES

By
WILLIAM TUCKER
Eastman Kodak
Rochester, N.Y.

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Among production jobs that may be done economically in the tumbling barrel are: degreasing, descaling, deburring, abrasive cut-down, non-abrasive cut-down, finishing, coloring, burnishing and rust inhibiting. Two of the six chapters cover general procedures for metal parts, ferrous and non-ferrous; a third chapter is devoted to the new technique of barrel finishing of plastic products. Much of the material in this chapter is based upon original research studies and has never before been described in print.

The remaining three chapters are devoted to compounds and their specific purposes; media, including all-purpose fused aluminum-oxide chips, aluminum-oxide abrasive spheres and triangles, steel shapes, etc.; and the equipment needed for precision barrel finishing. The latter chapter pictures and describes barrels in a wide range of sizes and such necessary accessories as screen-type and magnetic-type separators, bins for chips and compounds, centrifugal dryers and a universal tumbling rack. A layout for a tumbling department is included.

Basic Electrotechnics by B. L. Goodlet, O.B.E., M.A., MIEE. (St. Martin's Press) 288 pages, 170 illustrations, $5.25; AES members, $4.75.

A textbook for degree students. Contents: steady electric currents; electrostatic fields; condensers, and dielectrics; electrodynamics; the calculation of magnetic fields; alternating currents; transient phenomena; Maxwell's equations and electromagnetic waves.

Specifications and Tests for Electrodeposited Metallic Coatings 104 pages, $1.85; AES members, $1.70.

This compilation of 17 specifications, methods of test, and recommended practics embodies the work of ASTM Committee B-8 on Electrodeposited Metallic Coatings. These ASTM Standards in the field of electrodeposition of metals have either been developed jointly with the American Electroplaters' Society, or have had subsequent endorsement by this group.

The last issue of the B-8 compilation was October, 1953, and since that time all but 5 of the 17 standards have been revised. Many of the revisions have been based on extensive research projects within the committee, including long-time atmospheric exposure tests of copper-nickel-chromium plated steels.

The book contains specifications for zinc, cadmium, nickel-chromium, and lead on steel; nickel-chromium on copper; nickel-chromium on zinc; and chromate finishes on zinc coatings. In addition there are recommended practices for preparation of low-carbon steel, high-carbon steel, zinc-base die castings, and copper-base alloys for electroplating; chromium plating on steels; and preparation of and electroplating on stainless steel and aluminum alloys. Methods of test include test for local thickness and two spray tests—the salt spray (B 117) and the acetic acid-salt spray (B 287).

All those concerned with electroplating, the purchase or sale of plated products, those people concerned with the use of protective coatings and others will find this compilation of value.

ASTM Specifications for Steel Piping Materials 432 pages, $4.00; AES members, $3.60.

The 1955 edition of this compilation sponsored by ASTM Committee A-1 on Steel contains the latest approved form of 58 ASTM specifications for ferrous pipe, tubes, castings, fittings, and bolting materials.

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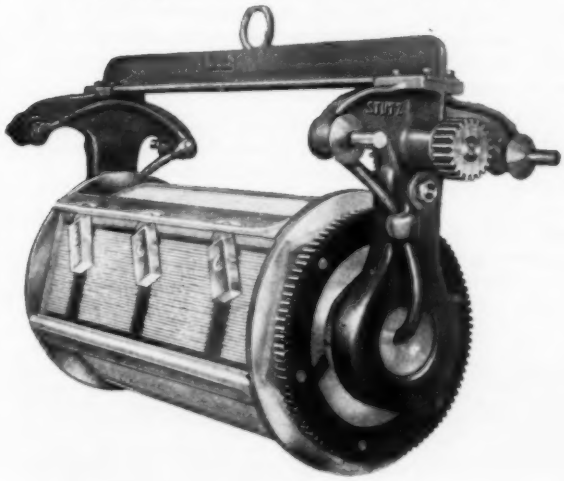

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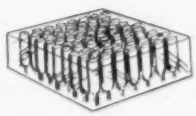

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BOOKS

ASME Handbook: Engineering Tables. Edited by Jesse Huckert. Sponsored by the Metals Engineering Handbook Board of the American Society of Mechanical Engineers. 704 pages. (McGraw-Hill.) $12.00; AES members, $10.20.

In this reference book, one of the four volumes comprising the ASME HANDBOOK, engineers and designers now have available many tables of recognized design standards of the type not commonly found in handbooks.

Typical of these are the table of involute functions—methods for finding loads on ball bearings—and information on bars and tubes suitable for reworking into gears, levers, shafts, or screws.

This practical volume makes design calculations easier and saves the engineer time. It places in his hands a wealth of the most useful design tables to supplement his knowledge of standards for shape, dimension, gears, and the like.

Engineering Tables are conveniently arranged in 15 sections, grouping together tables which apply to the design of specific parts. It covers such subjects as bar stock and shafting; bearings; spur, helical and herringbone, bevel, and worm gears; cylindrical fits; keys and keyseating; bolts; springs, aircraft and mechanical tubing; serrations and splines; electrical motors, and gaskets.

Jesse Huckert is Professor of Mechanical Engineering at The Ohio State University. He formerly was Associate Editor of *Product Engineering*.

Other volumes of the ASME HANDBOOK are: *Metals Properties, Metals Engineering—Design*, and *Metals Engineering—Processes*.

PB 111631 Handbook on Titanium, Part I, 210 pages, price $3.

PB 111873 Handbook on Titanium, Part II, 161 pages, price $4.25.

An Air Force handbook on the properties and production of titanium, in two volumes, has been released for distribution to industry through the Office of Technical Services, U. S. Department of Commerce.

The information contained in the two-part handbook was collected through a literature survey and by personal contact with authoritative individuals and institutions. The work was done by Dr. H. K. Adenstedt, staff metallurgist of the Lycoming Division, Avco Manufacturing Corporation, under contract with Wright Air Development Center, U. S. Air Force.

Part I, whose three major sections cover titanium production, physical metallurgy, and properties, was completed in August 1954. Part II, with two major sections, covers laboratory procedures and fabrication. It was completed in September 1955, following a year's investigation.

These volumes may be ordered from OTS, U. S. Department of Commerce, Washington 25, D. C. *Please order direct.*

1954 Supplement to the Bibliography and Abstracts on Electrical Contacts (ASTM Special Technical Publication No. 56-I) 48 pages, $1.00; AES members, .90.

In 1952 the Bibliography and Abstracts on Electrical Contacts (ASTM STP 56-G) was reissued to include the original printing of January 1944 and the intervening supplements. STP No. 56-H contained the 1952 and 1953 supplements. The current publication includes the references collected between January 1954 and January 1955.

Chemical Safety Supervision by Joseph Guelich (Rheinhold Publishing Corp.) 224 pages, $4.50; AES members, $3.85.

Written in very simple, down-to-earth language with hundreds of cartoon-type illustrations of practical pointers on safe working habits, this book is a *must* for everyone working in plants where chemicals are manufactured or used.

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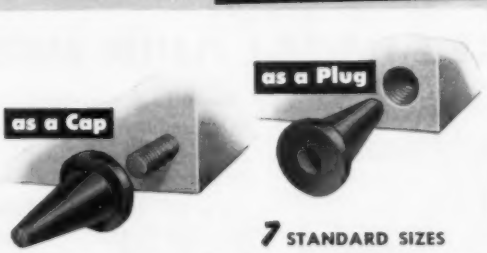

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25 Years Ago

Twenty-five years ago in April 1931 the MONTHLY REVIEW had an editorial which read more like an advertisement. It was not written by a staff member but was taken from the publication "The Travelers Standard," of The Travelers Insurance Co. It was entitled "Worse Than War," and dealt with the terrible number of highway and automotive accidents in the United States. It ended with the impassioned plea that the public be aroused.

The rest of the issue on the other hand, confined itself to matters of prime interest for the members. John J. Mulligan, Supt., U.S.S. Lead Refinery, Inc. had an article on "Practical Use of the Electromotive Series in Electrodeposition and Separation of Metals;" there was a report of a summary of a conference on exposure tests of plated coatings; a summary of a report on the conference of electroplating standards.

Baker and Holbrook, both of the University of Michigan, wrote on "Increasing the Efficiency of Commercial Metal Polishing;" Lt. Willink of Frankford Arsenal wrote on "Chromium Plating of Tools and Gauges;" Oliver Sizelove had an article on "Gold Solutions."

In the AES page was recorded a letter written by T. C. Eichstaedt of the Detroit Branch in which he brings out a problem which is still somewhat in evidence in publications. He objects to the fact that chemical formulas are used by authors, whereas a large portion of the readership does not have enough acquaintance with chemistry to interpret them. He asks, therefore, that the common name for every chemical term be given.

Ten branches reported in this issue. In all, a neatly turned issue of 68 pages.

10 Years Ago

Ten years ago in the April 1946 issue of the MONTHLY REVIEW, there was an announcement of the 33rd Annual AES Convention to be held in Pittsburgh on June 17–20.

There were articles by Hazel & Stericker on "Cleaning"; Struyk on "Copper-Tin Alloy Plating"; Moline on "Corrosion Resistance of Chromium"; Blum on "Health Hazards in Electroplating"; and Glasstone on "Cadmium Whiskers."

Eighteen pages reported in Branch News, a total of 114 pages with 56 pages of ads.

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INTERSOCIETY NEWS

Detroit District, ASTM, To Hold Dinner and Technical Session

Student Membership Awards to be Presented

On Wednesday evening, April 25 at the Engineering Society of Detroit, 100 Farnsworth, the ASTM will hold a dinner at 6:30 P.M. At 8:00 P.M. there will follow the presentation of student membership awards and a technical session.

Reservations for dinner are necessary and can be made by contacting **D. Dow,** Detroit Testing Lab., 554 Bagley, Detroit 26, Michigan. Cost $3.50 complete.

The subject of the technical session is "Research in the Electric Power Industry" by **O. H. Fellows,** president, ASTM and director, Engineering Laboratory and Research Dept., the Detroit Edison Co. Fellows, in his profusely illustrated talk, will cover aspects including latest development on: high voltage aluminum cable and extra-high voltage cable; wood preservation —poles, crossarms, etc.; corrosion—especially galvanized steel tower transmission; tree growth control; fish fences; insulating oils; hydrocarbons—fundamental research aspects; and nuclear power.

The Detroit District Council is awarding student memberships in the ASTM to two juniors and two seniors of each of the following schools: U. of Detroit, U. of Michigan, Michigan State U. and Wayne U. Selection of these students has been made by the deans of engineering of these schools in cooperation with a member of the Detroit District Council assigned to the school. The basis of the selection includes: recognized qualities of leadership in the eyes of the dean or his representatives; interest in the properties and applications of materials; scholastic average within the upper half of the class.

O. Fellows, director, Engineering Laboratory and Research Dept., The Detroit Edison Co., was graduated from Purdue with a BS degree in Chemical Engineering. He has been associated with Detroit Edison since 1919. O. Fellows was a pioneer in the study of water treatment and corrosion problems in steam generating plants and has written many papers and reports in this field. He is active in the work of numerous ASTM technical committees: electrical insulating materials, water, petroleum products, and corrosion among others. He has participated in the work of a number of other organizations including the ASME, Detroit Engineers Society, and in addition is a member of ACS, Corrosion Engineers, AWWA, and AAAS.

Fellows

ASTM B-8 SYMPOSIUM HIGHLIGHTS ASTM COMMITTEE WEEK

Close to 1500 ASTM members, representing 350 committees, registered for ASTM Committee Week at the Hotel Statler, Buffalo, February 16-March 2. Highlight of the conclave was an all day symposium featuring activities in the field of electroplating on February 29 with more than 300—most of them members of the American Electroplaters' Society—taking part.

R. A. Schatzel, ASTM vice-president, opened the meeting with a brief message of welcome and then turned the program over to symposium chairman W. L. Pinner of Houdaille Industries, Inc. R. E. Hess, ASTM associate executive secretary, served as symposium secretary while Pinner and R. J. McKay of International Nickel Co. (retired) were chairmen of the morning and afternoon sessions respectively.

1st Talk—History of ASTM Committee B-8

First of eight speakers was Dr. W. Blum, National Bureau of Standards (retired) who described the history of the B-8 committee. He cited some of the "growing pains" encountered since the inception of the committee in 1927 and the dilemma of cumbersome clearance of specifications among AES committees and boards which was resolved with the formation of B-8.

Blum emphasized the importance of the role of the American Electroplaters' Society in helping to set up and endorse joint

Plating Staff Photo

Upper left—A few of ASTM B-8 Symposium principals pose for photo with W. L. Pinner, program chairman. L. to r.: C. H. Sample, A. Mendizza, Pinner, G. Bowman, Dr. A. H. DuRose and Dr. W. Blum.

Lower left—Robert J. McKay (left), afternoon session chairman, chats with Dr. Sam Spring, one of the speakers, during a break.

Lower right—AES National 3rd Vice-President Herberth E. Head (left) talks over corrosion problem with Rod B. Teel, one of the afternoon session speakers.

Plating Staff Photo

HARR
Afternoon session speaker

Plating Staff Photo

ASTM-AES specifications. He paid particular tribute to the following for their efforts: C. L. Hippensteel, G. B. Hogaboom, E. Baker, C. Heussner, R. Wick and T. Slattery.

"The status and stature of the B-8 program has been greatly enhanced by ASTM-AES cooperation," said Blum. He concluded by saying that this important joint effort not only minimized duplication but resulted also in economy of time, effort and money.

2nd Talk—Corrosion Behavior and Protective Value of Cu-Ni-Cr Coatings on Steel

The second speaker was C. H. Sample, International Nickel Co. who discussed the latest findings in the corrosion of copper, nickel and chromium coatings with the aid of colored slides. He pointed up the superiority of the system in which half the desired nickel is first deposited, then buffed and finally deposited in the remaining half. Sample cited the need for the study of the mechanism of failure of cu-ni-cr in different areas.

3rd Talk—Evaluation of Methods Available for Measurement of Surface Luster of Electroplated Coatings

Glade Bowman of Standard Steel Spring Division, Rockwell Spring and Axle Company was the third speaker. He pointed out how surface reflections too often overshadow other more important properties of a coating. With slides, Bowman illustrated the results obtained with different types of measuring devices. He reported that surface measurements of metals before forming do not give the same measurements as after forming due to stresses and strains and other factors affecting the surfaces. He concluded by stating that no one instrument can reproduce the complete visual reaction to surface luster, nor even rank several surfaces in the same order.

4th Talk—Recommended Practices for Cleaning Prior to Electroplating

The importance of a clean surface and the desirability of a multiple cleaning cycle were stressed by the fourth speaker, Dr. S. Spring of Pennsalt Manufacturing Co. Among the do's and don'ts emphasized were the following: when applying a buffing compound, avoid burning it, avoid the aging period, use oils of lower viscosity. Spring showed slides with his talk and described the importance of re-evaluating parts at regular intervals for effectiveness of cleaning.

5th Talk—Comparison of the Corrosion Behavior and Protective Value of Electrodeposited Zinc and Cadmium Coatings on Steel

R. B. Teel of Kure Beach and Harbor Island Testing Stations, International Nickel Co., opened the afternoon session by discussing the recent corrosion tests at Kure Beach dealing with the comparison of zinc and cadmium as protective coatings. With the aid of slides he illustrated how there was little correlation between the salt spray and exposure test. He also described the varying degree of protective value between cadmium and zinc under different conditions.

6th Talk—Evaluation of Supplementary Coatings

According to a progress report, Dr. R. E. Harr of Western Electric Co., explained that results bear out already published information that chromate coatings do not prolong the life of zinc coatings. He showed slides of various supplementary coatings, namely phosphate on zinc, chromate on cadmium and chromate on zinc, and their resistance to exposure.

7th Talk—Atmospheric Exposure of Electroplated Lead Coatings on Steel

Dr. A. H. Du Rose of Harshaw Chemical Co. discussed the nature of films formed when lead corrodes, especially in industrial atmospheres. He showed the relationship between the protectiveness of lead coatings on steel as evaluated by visual inspection, steel weight loss and the corrosion rate of lead itself in several environments. Du Rose pointed out that a correlation exists between steel weight

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ASTM B-8 SYMPOSIUM

(Continued)

loss, thickness of coating and the corrosion rate of lead.

8th Talk—The Standard Salt Spray Test—Is it a Valid Acceptance Test?

The final talk of the symposium provoked the liveliest discussion of the day and was presented by A. Mendizza of Bell Telephone Laboratories. He concluded that the salt spray test as currently used, is not reproducible. W. L. Pinner, chairman of AES Research Project 15, emphasized that the American Electroplaters' Society "was not trying to justify the salt spray test" and added that Project 15 presently has "potent-looking possibilities," results of which will be presented at the forthcoming AES convention in Washington, D. C.

Among the difficulties cited in the present salt spray test were the following: there were no means of producing a standard plated coating because of the many variables involved; there was lacking a measuring stick which measures "something which is variable."

F. LaQue of International Nickel Co. urged shorter, less expensive testing methods while Dr. W. Blum cited the limitation of requirements of the salt spray cabinet.

Symposium chairman Pinner thanked the speakers for their efforts and praised the cooperation of the many members and publicity media for their help and contribution to a "most successful event." He announced that the papers, presented mostly in abstract form during the day, would be given in their entirety at the West Coast National Meeting at the ASTM in Los Angeles, September 16—22, 1956.

B-8 Subcommittee Meet

Five principal subcommittees of ASTM B-8 also met during ASTM Committee Week in Buffalo. Subcommittee I, headed by Fielding Ogburn, accepted a change in ASTM B-141 which permits electroless nickel to be used in place of electrodeposited nickel. A new section was formed to deal with "Nickel and Nickel Alloys Prepared by Chemical Reduction in Aqueous Solutions." The new committee, under the chairmanship of Walter Moline faces its first task, that of preparing a monograph on "The Properties and Applications of Chemically Reduced Nickel Coatings." A task group was set up to explore the possibility of having plated articles marked, "Meets ASTM Specification———." A letter ballot is being submitted to amend ASTM specifications on zinc plated steel to caution that at 750° F. zinc embrittles steel.

Sub-committee II, headed by Walter Pinner heard an extended discussion on the method of rating panels undergoing corrosion testing. It was proposed by Fred Lowenheim that a new rating system be considered which would rate panels separately for rust and for other surface damage. Carl Durbin compared this proposal with the present method of rating panels. This year, both methods will be explored in rating test panels.

Sub-committee III, whose chairman is Ray Ledford, decided to have Fielding Ogburn add a footnote to ASTM specifications relating to adhesion. Max Frager presented the final report of the group which had considered the effect of zinc coatings on steel at high temperature (see Sub I above). Lloyd Gilbert was made chairman of a new task group to make a similar investigation of cadmium coatings.

Max Frager, chairman of Sub-Committee IV directed that ASTM Recommended Practices be submitted to letter ballot on "Preparation of Malleable and Gray Iron for Electroplating" (section headed by Jim Lansing) and "Metal Cleaning Prior to Electroplating" (section headed by Sam Spring). Henry Kafarski was appointed head of a new section to consider the problem of industrial water for electroplating establishments. George Herrmann presented the final report of his section which had prepared a recommended practice on "Preparation of Lead & Lead Alloys for Electroplating." After extended discussion, this report was submitted for letter balloting by B-8. F. Nagley of the Bureau of Ships was made chairman of a new task group to consider the impact of the Sample's report on the value of the copper-nickel-buff-nickel-chrome system.

Sub-committee V, chairmaned by Marc Darrin continued its activities in the field of conversion coatings. The work of Russ Harr's group on chromate coatings was also discussed. A report by Allen Alexander's group on phosphate coatings was submitted for preliminary discussion.

Attendance was good, with the Subcommittees reporting about 60 persons at each meeting, and 300 attending the Symposium.

IMS Contest To Mark Twentieth Anniversary

The Industrial Management Society announces it is now accepting entries for its Fifth Annual Methods Improvement Contest to be held in conjunction with its 20th Anniversary Time and Motion Study and Management Clinic, October 31, November 1-2, 1956 at the Hotel Sherman, Chicago.

Student groups in colleges and universities studying industrial engineering, as well as industrial plants and companies are invited to submit entries in the Competition. The Society will award first, second and third place trophies to winning schools and companies. Individuals responsible for the improvements will receive certificates of merit.

Tall Oil Awards Announced

The Tall Oil Division of the Pulp Chemicals Association has announced awards of $500, $350 and $100 to Robert S. Aries and Melvin Wolkstein of the Polytechnic Institute of Brooklyn, Jacobus Rinse of Chemical Research Associates, and Paavo Kajanne of the Institute of Technology at Helsinki, Finland.

The top award of $500 went to Robert S. Aries and Melvin Wolkstein jointly for their studies on the esterification of tall oil with glycerol. Their findings on the best conditions for esterification, the effect of catalysts and the difference in the behavior of the fatty and rosin acids of tall oil will prove very helpful to the many manufacturers of this important ester.

Jacobus Rinse won the second prize of $350 for his paper on aluminum tritallate, a new tall oil derivative. The material is film forming and can be set by moisture. Rinse proposes the material as a fast setting vehicle and finds it soluble in and compatible with most paint materials.

Paavo Kajanne of Finland won the third prize of $100 for a paper tracing the changes in the composition of tall oil fatty acids from the time the pine tree is felled to the time the tall oil is produced.

Other significant papers were contributed and the publication of a number of these in addition to the three top papers is being arranged.

Seek New Inorganic Bonding

The Steel Founders Society, continuing its search for an inorganic bonding material, has earmarked nearly $100,000 for the research project.

The Society's Technical and Research Committee has awarded a contract to Horizons Incorporated, Cleveland, Ohio, specialists in research and development in the fields of metallic and non-metallic materials, to carry out the present search for such a suitable inorganic bonding material.

Horizons is to study the properties and behaviors of potential inorganic bonds, and to develop materials and processes suitable for bonding molding materials for the production of steel castings.

Bonding materials being used in the foundries today consist in the main of clay, organic materials and water. In some cases, as in shell molding, the bond is merely an organic material.

Molten metal coming in contact with present organic bonds reacts to produce large quantities of gas. Methods in use today involve complex procedures and the use of expensive materials to overcome these problems. The purpose of the research project is to seek materials and procedures that will eliminate certain steps and simplify the procedure and will, at the same time, produce a higher quality result.

This project and the Society's research program is supervised by a technical staff of which C. W. Briggs, Technical and Research Director of the Society, is head.

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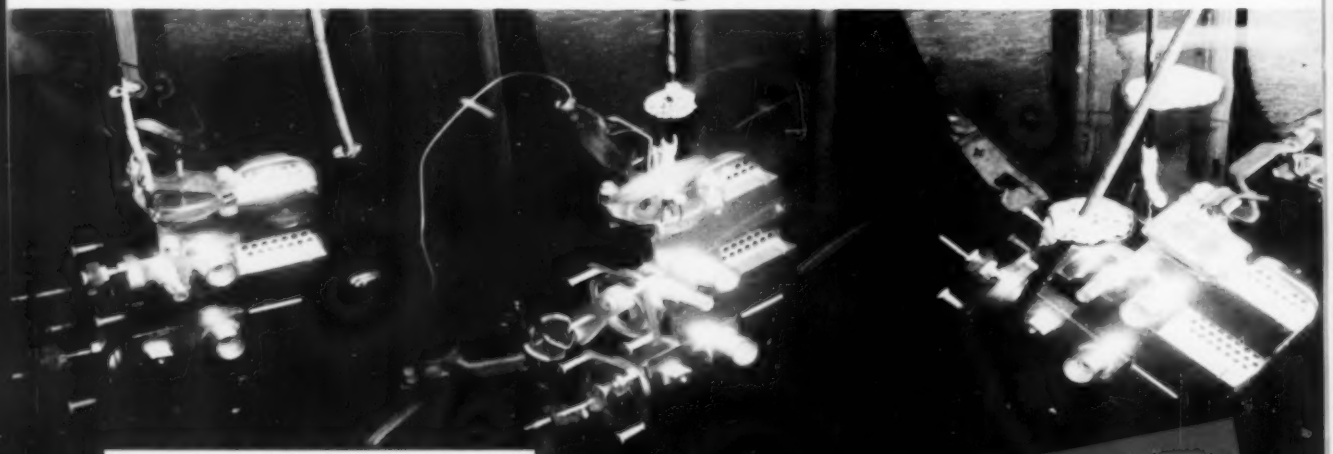

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Corrosion Symposium

Under the joint sponsorship of the Niagara Frontier Section of the National Association of Corrosion Engineers and the University of Buffalo, a symposium will be held on May 9 and 10. The meetings will take place on the campus of the University and the subjects, as announced by M. Stern who is Symposium Chairman are, "Control of Corrosion in the Chemical Industry" and "The Proper Use of Metals and Alloys for Corrosion Prevention."

The symposium covers the proper use and application of metals and alloys to prevent corrosion in the chemical industry. The program is directed toward the "general practitioner" who requires factual up-to-date information for rapid solution of every-day corrosion problems. It has been announced that an outstanding group of speakers familiar with recent developments will describe the use of metals of the future as well as the more common metallic materials.

The program:

May 9, 1956

A.M. "Fundamentals of Metallic Corrosion"—M. Stern, Metals Research Laboratories
"Iron-Base Alloys"—S. H. Kalin, U. S. Steel

P.M. "Stainless Steels"—C. P. Dillon, Carbide and Carbon Chemicals Company
"Copper- and Nickel-Base Alloys"—H. O. Teeple, International Nickel Company

May 10, 1956

A.M. "Aluminum and Magnesium Alloys"—H. P. Godard, Aluminum Laboratories, Ltd.
"Metallic Coatings"—W. W. Bradley, Bell Telephone Laboratories
"Lead"—K. H. Roll, Lead Industries Association

P.M. "Titanium, Zirconium, and Tantalum"—W. E. Lusby, Jr., E. I. duPont
"High-Alloy Materials"—E. D. Weisert, Haynes Stellite Company
"Chemical Plant Problems"—M. G. Fontana, Ohio State University

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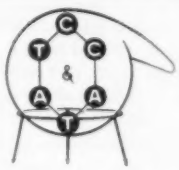

TCCATA

The Twin Cities Chemical & Allied Trades Association, Inc. is in its third year and has a membership of approximately one hundred persons. At a recent meeting the following were elected officers:

Clifford Barth, Merchants Chemical Co., president; Norman Anderson, Hawkins Chemical Co., vice-president; Bruce Heimark, Dow Chemical Co., secretary; Jack Hess, Minn. Mining and Mfg. Co., treasurer. The balance of the Board of Directors is made up of the following gentlemen: Ted Moore, Dow Chemical Co., Barney Ringsrud, Great Stuff Prod. Co., program chairmen; Harold Hopp, Owens, Illinois Glass Co., membership chairman; Ted Wanstad, Mallinckrodt Chemical Co., John Douglas, Lithium Corp. of Am., Inc., entertainment chairmen; Sydney Lankester, Diamond Alkali Corp., finance chairman.

ASME Design Engineering Conference Held At Philadelphia in May

Nine outstanding authorities in various aspects of design engineering will lead four days of discussions at the Design Engineering Conference, to be held at Convention Hall, Philadelphia, May 14-17.

The conference, sponsored by the machine design division of the American Society of Mechanical Engineers, will be held at the same time and place as the first Design Engineering Show.

Topics for the conference sessions include cost reduction in product design, procurement and training of design engineers, engineering materials for products,

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ASME Design Conference (*Continued*)

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Exhibits will demonstrate components, materials, finishes, shapes, forms and services used by design engineers for the manufacture of end products for consumer and industrial use. More than 150 of the anticipated 200 companies already have leased exhibit space.

The four editors who acted as a special committee to draft the program are Colin Carmichael, "Machine Design"; H. R. Clauser, "Materials & Methods"; George F. Nordenholt, "Product Engineering," and Frank C. Oliver, "Electrical Manufacturing."

New Association Formed

Formation of the Ultrasonic Manufacturers' Association has been announced by its newly elected officers and Board of Directors. Formed by the leading manufacturers in this new and rapidly expanding field, the UMA will promote dissemination of sound and accurate information about ultrasonic equipment and its applications. Existing ultrasonic equipment capabilities and future applications will be clearly represented to promote the growth of the industry on a firm and lasting basis. UMA will assist the ultrasonic industry in adopting ethical practices in sales, publicity and advertising. In addition, the UMA will aid its members to secure clear and realistic rulings from governmental agencies such as the Federal Communications Commission.

The officers of the Ultrasonic Manufacturers Association are:

President: W. C. Potthoff, Vice-President, Aeroprojects, Inc.; Vice-President: Stanley R. Rich, Tech. Director and Vice-President, The General Ultrasonics Company; Secretary: Norman Branson, President, Branson Instruments, Inc.; Treasurer: Jack Welch, General Manager, Machine Tool Div. Sheffield Corporation.

The Board of Directors include Potthoff and Rich as directors, elected for two years, and Branson and Welch for one year each. In addition, Dorr Wagner of Solar Mfg. Corp. was elected a director for two years, and R. B. Manning of Sperry Products and Stanley E. Jacke of Detrex Co. were elected directors for one year.

Formation of the UMA is the result of a series of meetings started last year by Potthoff of Aeroprojects. The companies represented or assisting at the meetings include:

Acoustica Associates, Inc., Aeroprojects Incorporated, Alcar Instruments, Inc., Bendix Aviation Corporation, The Birtcher Corporation, Blackstone Corporation, Bogue Electric Manufacturing Company, Branson Ultrasonic Company, Cavitron Equipment Corporation, Curtiss-Wright Corporation, Dallons Laboratories, Inc., Detrex Corporation, General Ultrasonics Company, Walter Kidde & Company, McKenna Laboratories, Inc., Magnaflux Corporation, Photocon Research Products, Sheffield Corporation, Solar Manufacturing Corporation, Sperry Products, Inc., Ultrasonic Engineering Company and Vibro Ceramics Corporation.

NSMPA To Publish Fifth Volume

Announcement of the start of a fifth volume on quality control by the National Screw Machine Products Association, has been made by Fred C. Noerenberg, Perry-Fay Company, Elyria, chairman of the NSMPA Quality Control Committee. The new manual is scheduled for publication by the end of 1956.

The writing of the series of volumes on this subject has been the work of a joint NSMPA and American Society of Quality Control committee, which was formed nearly five years ago. (At that time, the ASQC was asked to seat three of its men on the original NSMPA quality control committee.)

The purpose of the joint committee was to educate NSMPA members on quality control and to induce them to install quality control in their own plants. The previous four volumes, the heart of the overall program, were written by the committee in cooperation with professors from the University of Illinois and Purdue and were furnished to members.

At the completion of the fourth volume some months ago, the committee sought to determine whether a fifth volume, one which would detail the actual establishment and administration of a quality control system in a given company was desired by the members. Also, the committee felt it necessary to determine whether the overall program itself had succeeded and should be continued.

Accordingly, a questionnaire was sent to NSMPA member companies requesting answers to these questions, some of which are as follows:

1. 35.7 per cent of those answering said they had installed a quality control system since the start of the program.

2. 57 per cent of this group indicated that the Association's Quality Control Committee's program was an aid and inducement in the installation of their program.

3. 80 per cent of those answering stated that the previous four manuals were of great help in taking the mustery out of quality control. And of particular interest was that 82 per cent of the responding NSMPA members said they had quality control in their plants, either induced by the program, or as a part of their operations before the program was initiated.

On the subject of distribution of the fifth manual, and of special interest to industry at large, more than 80 per cent of the responding members stated that their customers should be eligible to receive copies.

And on the all-important question, "should the quality control program be continued", 86 per cent answered in the affirmative.

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BALTIMORE-WASHINGTON CONVENTION PAPERS

"According to Abner Brenner, Chairman, Education Committee, the following papers are tentatively scheduled for presentation. This list is subject to change but is presently expected to be offered."

1. **THE GROWTH AND PROPERTIES OF METAL WHISKERS**
   S. M. Arnold, Bell Telephone Labs., Inc.
2. **STUDY OF ADHESION BY THE HIGH SPEED ROTOR TECHNIQUE**
   J. W. Beams, Dept. of Physics, University of Virginia
3. **OVERLAY PLATING OF STEEL BACK-ALUMINUM LINED SLEEVE BEARINGS**
   A. H. Beebe, Jr., B. F. Rothschild and G. J. LeBrasse, Federal-Mogul-Bower Bearings, Inc.
4. **SOME CHARACTERISTICS OF ELECTROFORMED IRON DEPOSITS**
   G. R. Van Houten and A. M. Max, Radio Corporation of America
5. **ELECTRODEPOSITION OF ANTIMONY**
   A. H. DuRose, The Harshaw Chemical Co.
6. **THE PROTECTION OF MOLYBDENUM AGAINST HIGH TEMPERATURE OXIDATION**
   J. J. Harwood, Office of Naval Research, Dept. of Navy
7. **A STUDY OF THE EFFECT OF SEVERAL ORGANIC ADDITION AGENTS ON THE HARDNESS AND RESIDUAL STRESS IN NICKEL DEPOSITS**
   I. L. Newell, The Henry Souther Engineering Co.
8. **LEVELING—DEFINITION, MEASUREMENT AND UNDERSTANDING**
   J. D. Thomas, General Motors Corp.
9. **DISSOLVED GASES IN PLATING BATHS**
   W. M. Tucker, F. O. Beuckman, Eastman Kodak Co.
10. **GAGING THIN NICKEL COATINGS BY X-RAY FLUORESCENCE**
    W. W. Sellers and K. Carroll, International Nickel Co., Inc.
11. **CHROMIUM PLATING OF GUN BORES**
    V. A. Lamb and J. P. Young, National Bureau of Standards
12. **LIMITATION OF PLATED NICKEL IN JET ENGINE DESIGN**
    R. W. Moeller and W. A. Snell, Pratt and Whitney Aircraft
13. **STUDY OF PHOSPHATE TREATMENTS FOR METALS**
    Lloyd Gilbert, Rock Island Arsenal
14. **PROPERTIES OF ELECTRODEPOSITS AT ELEVATED TEMPERATURES**
    W. H. Safranek and G. R. Schaer, Battelle Memorial Institute
15. **ELECTRODEPOSITION OF POROUS NICKEL-CADMIUM ALLOY**
    L. D. McGraw, J. P. Spenard and C. L. Faust, Battelle Memorial Institute
16. **COATED ABRASIVE BELTS SPEED METAL WORKING PRODUCTION (Motion Picture in Color)**
    Behr-Manning Coated Abrasives Div. of Norton Co.
17. **GOLD-SILVER ALLOY PLATING**
    A. G. Cafferty and R. E. Harr, Western Electric Co., Inc.
18. **TANK LININGS**
    K. G. LeFevre
19. **ORGANIC FINISHES ON PLATED PRODUCTS**
    G. L. Luthauser, General Motors Corp.
20. **A NEW ORGANO-ALUMINUM CHLORIDE BATH FOR DEPOSITION OF ALUMINUM**
    N. F. Murphy and A. C. Doumas, Virginia Polytechnic Institute
21. **THE EFFECT OF IMPURITIES AND PURIFICATION OF ELECTROPLATING SOLUTIONS. I. NICKEL SOLUTIONS**
    A. THE EFFECTS AND REMOVAL OF ALUMINUM (AES Project 5)
    D. T. Ewing, A. J. Smith, Michigan State University
    W. O. Dow, Jr., Sunbeam Corp.
    B. THE EFFECTS OF MANGANESE
    A. J. Smith, Michigan State University
    R. J. Rowe, Dow Chemical Co.
22. **PROGRESS REPORT ON ACCELERATED CORROSION TESTS FOR THE PERFORMANCE OF PLATED COATINGS (AES Project 15)**
    W. L. Pinner, Houdaille-Hershey Corp.
23. **RADIOGRAPHIC DETECTION OF PORES IN NICKEL COATINGS**
    F. Ogburn and M. Hilkert, National Bureau of Standards
24. **THE PERMEATION OF GASES THROUGH ELECTROLYTIC NICKEL DEPOSITS AS AFFECTED BY ACCELERATED CORROSION**
    J. Martin Tobin and D. Gardner Foulke, Hanson-Van Winkle-Munning Co.
25. **PLATING ROOM TANK VENTILATION EQUIPMENT**
    F. W. Arndt, Heil Process Equipment Corp.
26. **HARD CHROME PLATING OF TITANIUM ALLOYS**
    L. Missel, Lockheed Aircraft Corp.
27. **ACCEPTANCE SAMPLING BY VARIABLES—A TOOL FOR DECISION**
    R. H. Moore, Los Alamos Scientific Laboratory
28. **IMPROVED TECHNIQUES FOR ELECTROLESS NICKEL PLATING ON NONCONDUCTORS**
    H. Narcus, Electrochemical Industries, Inc.
29. **FILTER MEDIA**
    J. Hood, E. Lundberg, Q. O. Shockley, M. L. Whitehurst, Indianapolis Branch of the AES
30. **NICKEL-IRON ALLOY DEPOSITS FOR MAGNETIC SHIELDING**
    V. P. McConnell, I. W. Wolf, General Electric Co.
31. **THE POLAROGRAPHIC DETERMINATION OF CADMIUM AND CYANIDE IN ALKALINE CADMIUM PLATING SOLUTIONS**
    G. T. Forsyth, Udylite Research Corp.
32. **INVESTIGATION AND EVALUATION OF PLATING PROCESSES AND PLATE COMBINATIONS FOR USE ON ETCHED CIRCUITRY**
    E. H. Babcock, R. K. Stephens and R. C. Grinsinger Convair
33. **ELECTROPLATING ON UNUSUAL ALLOYS**
    C. Levy, Watertown Arsenal
34. **HYPERBOLIC ELECTROPLATING CELL**
    R. F. Walton, Radio Corporation of America
    R. Gilmont, Manostat Corp., N. Y.
35. **THE ADHESION OF ELECTROPLATED COATINGS TO TITANIUM**
    C. Stanley and A. Brenner, National Bureau of Standards
36. **SOME RECENT DEVELOPMENTS IN SELECTIVE LOCALIZED PLATING FOR ENGINEERING PURPOSES**
    M. Rubinstein, Metal Finishing Consultant
37. **CURRENT DISTRIBUTION ON MICROPROFILES**
    D. Gardner Foulke and Otto Kardos, Hanson-Van Winkle-Munning Co.
38. **SPECTROCHEMICAL DETERMINATION OF NICKEL IN BRIGHT CADMIUM PLATING SOLUTION**
    M. Levy and H. Friedberg, Crobaugh Labs.
39. **COMPLETE POLAROGRAPHIC ANALYSIS OF CYANIDE ZINC PLATING BATHS**
    T. H. Collard, Jr., and D. K. H. Liu, Friedrich Refrigerators, Inc.

BALTIMORE-WASHINGTON CONVENTION NOTES

The hospitable capital of the world —Washington is ready to greet you. Hotel reservations are being made, committees are bringing their preparations to a conclusion, the technical papers are in good order, the tours are planned, the food is ordered—you'll be treated as royally as any royalty that's ever visited our great capital.

Asaf A. Benderly will take care of your reservations. Get in touch with him today.

See you in Washington
It's a capital idea

TABULATED TOURS

TOUR No. 1

Place

Library of Congress
One of the largest libraries in the world. First draft of Gettysburg Address; Gutenberg Bible; Miscellaneous—Historical Papers.
Transportation—No. 40 Lincoln Park car from K & Connecticut

Folger Shakespeare Library
Collection of Shakespeareana and Elizabethan Theater.
Transportation—Cross street from Library of Congress

The Capitol
Guided tours every 15 min. 25c. To see Congress in session, obtain pass from your senator or representative. Any Capitol Guard can tell you when he is in town.
Transportation—Walk 1 block.

Senate Office Bldg.
Transportation—Subway from sub-basement in North wing of Capitol.

Botanical Gardens
Large collection of rare plants and flowers.
Transportation—Walk to South-West corner of Capitol Grounds.

Department of Justice
FBI tours, 9:30 to 4:00
Transportation—Walk west on Pennsylvania Avenue to 9th Street

Archives Building
Declaration of Independence; The Constitution.
Transportation—Walk west on Pennsylvania Avenue to 13th Street

Department of Commerce Building
Continuous statistical recording machine for births and deaths. Aquarium.
Transportation—Walk west on Pennsylvania Avenue to 14th Street

Pan American Union Building
Patio with Aztec & Mayan motif; banana, coffee, rubber, and papaya trees. Exhibits of South American Craftsmanship.
Transportation—Walk South to Constitution Avenue and West to 17th St.

Return to Statler by R-4 Farragut Square bus from 18th and Constitution.

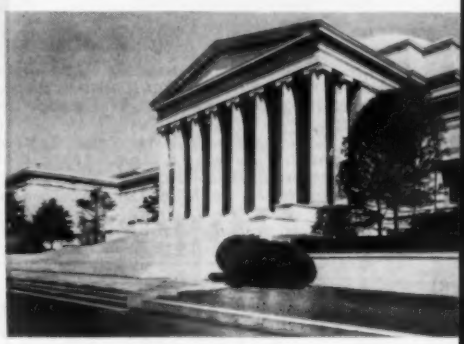
TOUR No. 2

Place

Smithsonian Institution
Gigantic and intriguing collection of everything pertaining to the social and industrial history of the country.
Transportation—S-2, Federal Triangle bus from 16th and K.

Mount Vernon
Estate of George Washington.
Transportation—A. B. & W. bus from 12th and Pennsylvania.

Tidal Basin & East Potomac Park
Cherry Blossoms (in April); Jefferson Memorial
Transportation—Taxi ride returning to hotel from bus terminal after return from Mt. Vernon.



THINGS TO DO AND SEE IN WASHINGTON

TOUR No. 3

Place

National Presbyterian Church (if in town on a Sunday)
President attends 9:00 A.M. Service when he is in town.
Transportation—Taxi to Connecticut Avenue and H St. (60c)

National Zoological Park
1800 acre woodland setting for one of the finest zoos in the country.
Transportation—Taxi (60c)

Washington Monument
View of District of Columbia, Maryland, & Virginia from 500 ft. height.
Transportation—From Zoo take L2 or L4 bus to 14th & K; transfer to 50 or 54 streetcar and get off at 14th & Constitution.

Washington Waterfront, Maine Avenue
Sea Food Restaurants. Herzog's, Hogate's Naylor's New England.
Transportation—Taxi from Washington Monument.

National Gallery of Art
Collection of some of the world's most famous paintings. Concerts at 8:00 P.M. on Sunday.
Transportation—Taxi from Waterfront.

TOUR No. 4

Place

Bureau of Engraving
Printing of currency. Free guided tours 8 to 11 A.M. & 12:30 to 2 P.M.
Transportation—Bureau of Engraving streetcar from 14th & K to end of line.

Supreme Court Bldg.
Court sessions open to public at 11:00 A.M. Free Guided tours of building.
Transportation—Taxi from Bureau of Engraving.

Arlington Cemetery
Tomb of Unknown Soldier and frequent military funerals.
Transportation—Taxi from Supreme Court to Lincoln Memorial and Arnold bus to cemetery entrance.

Georgetown section of Washington
Little changed from early years. Called the most beautiful section of Wash. Antique Row of Wisconsin Ave. Georgetown University.
Transportation—No. 4 Arnold bus from Arlington to Rosslyn, Va. Navy Yard streetcar to 31st & M Sts.

TOUR No. 5

Place

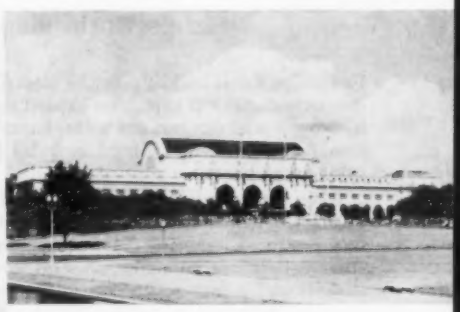
White House
Guided tour through rooms open to the public.
Transportation—Walk from Statler, South on 16th Street.

Corcoran Gallery
Collections of paintings by American and European artists.
Transportation—Walk from Whitehouse to 17th & E.

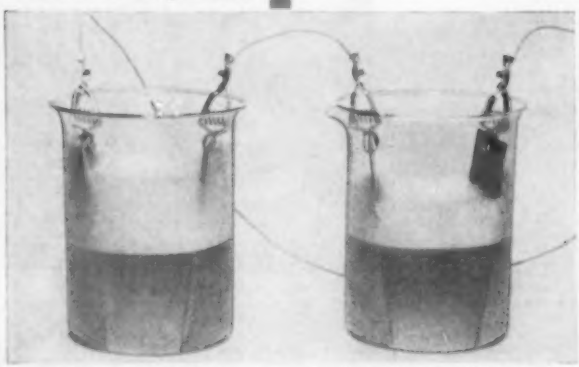
Freer Art Gallery
Whistler Collection and Chinese art.
Transportation—Taxi from Corcoran

Ford's Theater
Lincoln Museum.
Transportation—Taxi.

Shopping District
Hecht's, Kann's & Lansburgh's at 7th & F; Woodward and Lothrop at 10th & F and Garfinckel's at 14th & F.
Transportation—Walk from Lincoln Museum



Pre-cleaning for Barrel Plating Lines



DIFFERENCES IN FOAM BUILD-UP *developed by two different electrocleaners are shown above. Beaker at left contains a conventional electrocleaner in general use: beaker at right contains Diversey No. 12 electrocleaner. A current of 125 amps per sq. ft. on work is sent simultaneously through each beaker. Ordinary electrocleaner (left) produces a thick, heavy foam blanket which, in your cleaning tanks, would trap an explosive mixture of hydrogen and oxygen gases. In Diversey No. 12 electrocleaner (right) foam blanket is properly controlled . . . this is your guard against explosion dangers* and *solution spray.*

How to control foaming and

GUARD AGAINST EXPLOSION DANGERS

in electrocleaning

Excessive foam build-up in the electrocleaner tank always creates a danger of explosion caused by build-up of trapped hydrogen and oxygen gases. In barrel plating, this excessive foam build-up is increased by the agitation of the solution as barrels are rotated.

Even under extreme agitation conditions, Diversey No. 12 electrocleaner not only minimizes the explosion hazard but produces superior cleaning as well. Due to its high current-carrying capacity, this improved electrocleaner is exceptionally fast-acting on all types of contamination. And its high contamination capacity means longer periods between dumpings.

FREE-RINSING, NON-CAUSTIC SOAK CLEANER

In barrel cleaning, excessive solution is carried over from soak tanks to electrocleaning tanks. The result is two costly problems: (1) excessive carry-out means higher soak cleaner consumption; (2) carry-over of soil-laden solutions shortens electrocleaner life. Diversey No. 404 soak cleaner was specifically developed with extraordinary wetting action and water softening properties. Since these two factors combine to give faster rinsing and draining, No. 404 assures you a more efficient use of both soak and electrocleaning solutions. Soak cleaning solutions drain back into soak tank or are rinsed free. Upkeep costs are reduced, solution life is increased, carry-out is minimized.

Better wetting action also means better cleaning. Since immersion time in soak cleaner is limited, No. 404's fast-wetting (soil penetration) leaves more time in the cycle for actual cleaning. This is another reason why No. 404 removes the toughest contamination.

For free illustrated brochures on Diversey metal cleaners, write Metal Industries Department, The Diversey Corporation, 1820 Roscoe St., Chicago 13, Illinois.

Meet Mr. President

William K. Murray has been a member of the New Haven Branch since 1948 and a branch officer since 1952. He was elected President in 1955.

Bill is a graduate of Rensselaer Polytechnic Institute, receiving his Bachelor of Chemical Engineering degree in 1944. After a tour of Navy duty as an engineering officer on an aircraft carrier, and several positions with chemical firms, he entered the metal finishing field in 1948 as a finishing engineer at R. Wallace & Sons Mfg. Co. in Wallingford, Conn. He subsequently became laboratory supervisor of the Wallace Brothers Division of that firm before leaving in 1953 to join Enthone, Inc. of New Haven as technical service engineer. In this capacity he has appeared before many Branches of the AES asguest speaker on subjects pertaining to plating.

Murray
New Haven

Bill is 31 years of age, a member of the ASM and the Electro Chemical Society.

He is married and has three children: a son and two daughters.

In addition to his duties as Branch President, Bill is also General Chairman of the New England Regional Meeting of the AES which will be held at the Hotel Statler in Hartford on April 7th.

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ONE PIECE SEAMLESS GAUNTLET. BLACK, ROLLED EDGE PROTECTION. EACH PAIR CARTONED.

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Meet Mr. President

Ralph Brouwer, the 1955–56 President of the St. Joseph Valley Branch, of the AES, was born in Holland, Michigan, on June 16, 1916.

He attended Holland Christian Schools and Hope College in Holland. While attending college he worked as a chemist for the Lake Shore Sugar Company.

Brouwer
St. Joseph Valley

He was drafted in the spring of 1942, and served in the Laboratory Division of the Medical Corps until his medical discharge in November of 1942.

From the fall of 1942 until April 1945 he was chief chemist for the Doughnut Corporation of America. He was active in the development of a process for the production of dextrose, glucose and glutamates from wheat flour.

In April of 1945, he joined the Haviland Products Company, of Grand Rapids, Michigan, as a sales engineer. He calls on the metal finishers in Southwestern Michigan, Northern Indiana and Northeastern Illinois. His work includes the sales and servicing of plating supplies, and Haviland's own cleaning and metal treating surfactants.

He joined the AES in the Grand Rapids Branch in 1946 and transferred to the St. Joseph Valley Branch in 1948. He has served as Librarian, 1st and 2nd vice-president since then.

He is married; the father of two boys and two girls.

His hobbies are photography, carpentry and amateur naturalist.

ZINC PLATERS:

FOR QUALITY PERFORMANCE AT LOWEST COST, purify cyanide zinc plating solutions with

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Regular use keeps zinc solutions constantly clear. Eliminates need for ANY OTHER purifying treatment. Brightens work.

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55 balls per square foot of surface
PRICE—$100 per thousand

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The one bath especially designed for plating DIRECTLY on ZINC, LEAD, ALUMINUM, BRASS, COPPER and IRON.

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Harder deposits. Increased throwing power. Less sensitivity to sulfate content. Exceptionally fine results plating anything calling for Decorative or Hard Chrome.

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AES NEWS

PLATING COURSE INFO RELEASED BY SOCIETY

Section IV E of the Branch Officers' Manual entitled "Courses in Electroplating and Metal Finishing," was released February 20 by Dr. Samuel Heiman, Society 1st Vice-President and national educational chairman. This section, considered one of the most important additions to the BOM, was compiled by Louis Serota (New York), Arthur G. Pierdon (Baltimore-Washington) and Fielding Ogburn (Baltimore-Washington) under the direction of Heiman.

Designed to help branches in organizing and maintaining courses in electroplating, the report recommends a procedure and includes a survey of courses and a supplement which cites courses presently being given on the college level.

Mrs. F. C. MESLE

Mrs. Mary L. Mesle, 73, wife of the Rev. Frank C. Mesle of Sherill, N. Y. succumbed at her home after a long illness on January 21. A familiar figure at AES conventions, Mrs. Mesle was born in Numdee August 14, 1882 and was married to Mr. Mesle in Sommerville, Mass. on June 20, 1911.

She attended Burdette Business College, Boston and was once secretary to the trustees of the Andover (Mass.) Theological Seminary.

A member of the Reorganized Church of Jesus Christ of Latter Day Saints, Mrs. Mesle was prominent in work with the OES, King's Daughters, Oneida Musicale and the WCTU.

She is survived by her husband; two sons, the Rev. F. Carl Mesle, Jr. of Independence, Mo.; Capt. Richard L. Mesle of the U. S. Air Force in Japan; a daughter, Mrs. Dorothy Fisher, Winchester, Mass.; eight grandchildren, and a sister, Mrs. G. L. Davison, Washington, D. C.

THREE NEW MEMBERS

Three more progressive firms have joined the AES Research effort through the important medium of the Sustaining Membership program. The new firms are:

Firm and City	*Branch Credit*
Production Plating Co. Adel, Ga.	Southeastern
Royal Typewriter Co. Division of Royal McBee Corp. Hartford, Conn.	Hartford
Sprague Electric Co. North Adams, Mass.	Capitol District

Number of Sustaining Members supporting AES Research through this month . . 342*

Number of Sustaining Members supporting AES Research through last month . . 340

* This represents a net gain.

DR. RICHARD M. WICK

Dr. Richard M. Wick, Assistant Division Head, Research Department, Bethlehem Steel Company, died in Baltimore, Md., February 18.

Dr. Wick was born in Topeka, Kansas, April 2, 1903. He was graduated from Massachusetts Institute of Technology with a BS degree in 1925, and an MS the following year. In 1932 he received a PhD degree from Johns Hopkins University. After working for the U. S. Bureau of Standards in Washington and Philadelphia, he came to Bethlehem in 1938. Here his entire time was given to the study and development of metallic coatings on steel.

Among his affiliations were the American Chemical Society; National Society of Corrosion Engineers; American Electroplaters' Society, in which he served as chairman of the research committee in 1948–49; American Institute of Chemical Engineers, and the Engineers Club of Lehigh Valley. He was a registered professional engineer in the Commonwealth of Pennsylvania.

He was a resident of Allentown, Pa., and leaves his wife and two sons.

AN APPRECIATION OF TOM SLATTERY BY DR. WILLIAM BLUM

I first met Tom Slattery at the AES Convention in Detroit in 1918. George Hogaboom introduced him to me and suggested that Tom should come to work with me in the Electroplating Section at the Bureau of Standards. To do so Tom enlisted as a private in the Chemical Warfare Service and was detailed to assist me in electroplating studies. Also with me during World War I were George B. Hogaboom and Fred J. (Dad) Liscomb. They and Tom and Loretto Slattery all lived with us in our home in Chevy Chase, Md.

Thus began a friendship with Tom that is a precious memory in my life. In 1920 we developed an electrolytic process for making the printing plates at the Bureau of Engraving and Printing. Tom Slattery was placed in charge of the Electrolytic Section, in which position he initiated and applied the researches conducted at the N.B.S. on depositing chromium and iron, that have made the electrolytic process so successful.

His ability to direct work and personnel led to his appointment in 1941 as Assistant Director of the Bureau of Engraving and Printing, where he served until 1953, when he retired because of ill health. He and his wife, Loretto (Moss) Slattery then moved to a home in Paradox, N. Y., a beautiful spot in the Adirondacks, where they had gone for over thirty years for summer vacations. He thoroughly enjoyed his life there, but his health did not improve. He died there from a heart attack on February 25, 1956 in his seventieth year. He was buried at Schroon Lake, N. Y.

Slattery in 1936 when he was President of AES

Tom inherited his interest in electroplating from his father, John Slattery, who was the plater at Cornwell and Patterson in Bridgeport, Conn. Tom joined the AES about 1916 and was always a loyal and active member. He was a charter member of the Baltimore-Washington Branch when it was formed in 1928, and was President of the Branch when the AES Convention was held in Washington in 1930. As a regular delegate to the Annual Conventions, he took an active part, and was elected President in 1935. During his term a new AES constitution was adopted, in which were incorporated many provisions that have led to the growth and success of the Society. As president he conducted the negotiations with the American Society for Testing Materials that led to the publication of the Joint Specifications for Electrodeposited Metallic Coatings. He was made an honorary member of the AES in June 1949.

He continued his interest in the AES as a Past President, and had a large influence in the affairs of the Society because of his fine personality and clear thinking. Up to the time of his leaving Washington, he also took an active part in the B-W Branch. Through his position at the Bureau of Engraving and Printing, he joined the "Printing House Craftsmen,"

an organization of technical executives. He was President of the Washington Section of that Society.

Next to plating and possibly even more important in his life was his love of music, and especially of singing. At many of the conventions his beautiful tenor voice entertained the gatherings more effectively than professional talent. He was a member of the Chevy Chase Chanters, a male choral group in Washington that was outstanding in its performances. He sang in the choir of his church and in the Friendly Sons of St. Patrick.

The Slatterys adopted two children, Teddy Slattery, who now lives near Baltimore, Md., and Audrey Slattery, now Mrs. Floyd Ray Miller of Detroit, Mich., who has four children. Tom Slattery's widow, Mrs. Loretto Slattery, resides at Paradox, N. Y.

With a limited technical education, Tom acquired a great knowledge of and appreciation for science and research in electroplating. He took courses in chemistry at George Washington University and several courses for platers given by the B-W Branch.

He was loved by all who knew him in the AES and other organizations. Mrs. Blum and I are proud that since they lived in our home in 1918, Tom and Lorretto always addressed us as "Mother" and "Daddy" Blum. Almost every year Tom and I fished together in West Virginia, when strangely enough we never discussed plating, but simply the size of the bass we hoped to catch! On a memorable visit that Mrs. Blum and I had with the Slatterys at Paradox in 1955, Tom and I fished several times in Paradox Lake, renewing memories of our fishing in West Virginia.

From all of these associations, I can truly but sadly say that by Tom Slattery's passing, I have lost a friend who was like a brother to me.

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Air-Cooled

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Treat that final rinse!

SPOT Free
CLOUD Free
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Many time saving methods and materials will be discovered by writing for our descriptive catalogue covering specialty chemical compounds in addition to our complete line of dustless cleaners, burnishing compounds and emulsions.

work is assured when Angler SUN-UP is used in your final *hot* rinse at concentrations ranging ½ to 1 pound per 100 gallons of water.

Angler SUN-UP is a Safe-easy to handle liquid material which is readily soluble in warm or hot water. Angler SUN-UP is packaged in 1 gallon and 4 gallon cases—30 and 50 gallon drums. Final rinsing is as important as your cleaning cycle. Do not neglect it! Use Angler SUN-UP.

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MAIL BOX-

DEAR SIR:

Should you ever receive an inquiry from any institution of learning or large industrial organization which might be interested in procuring an almost complete 46 year collection of "Metal Finishing" magazine, including about 17 hard bound volumes and the balance in single copies, all in good order, may I say I have them to offer at a reasonable price plus shipping expense.

In appreciation of a satisfactory price for this valuable collection of practical and technical information if the buyer will pay shipping cost, I offer as a gift, any or all of the following:

Several years of PLATING magazine.
Several years of "Plater's Guide Book."
Several years of "Products Finishing."
Several years of "Organic Finishing."
Several years of bound AES Convention Proceedings.

Plus some old books on various subjects such as chemistry, plating, handbooks of tables, roots, logarithms, electrical engineers, steam engineers, plumbers and steam fitters, electrochemistry, algebra.

Sincerely,
A Subscriber

DEAR SIR:

We would like to extend our thanks, to the staff of PLATING and the American Electroplaters' Society for the fine job they turned out on our article entitled "Scratching the Surface," which appeared in the January issue of your magazine. This particular issue of PLATING was, in our opinion, one of the finest published by your organization. The art work was excellent, the reading matter was easily read and digested, and the subject matter well chosen (from the standpoint of preparing metals for plating). We have been receiving the PLATING magazine for over six years now, and we have noticed a change (for the better) during the past year or so. The cover and advertising are more colorful and interesting to read and the technical articles seem to be more easily read and understood.

Thank you again for the excellent work done on our article (and the prompt service in furnishing us with reprints). Keep up the good work in publishing a magazine that can be read and absorbed by the average finishing man, rather than only by a college professor.

Yours very truly,
Steve Yacus
Metal Parts Sales Co.
Newark, N. J.

DEAR SIR:

Having recently joined the society, I was quite eager to receive my first issue of PLATING. When I finally received it I must admit I was really thrilled to find it as interesting and informative as I had hoped it would be.

Reading through the pages I found many ads by firms I am already doing business with.

May I take this opportunity to congratulate you for the excellent periodical you put out.

Sincerely,
Walter Alina
Hermetic Seal Products Co.
Newark, N. J.

DEAR SIR:

Thank you for your kind letter of February 27 and the lovely tribute paid Tom therein.

Please extend my heartfelt thanks to the members of the American Electroplaters' Society for the beautiful flowers so kindly sent. It was a most comforting expression of sympathy from his many Society friends.

Sincerely,
Loretto M. Slattery
Paradox, N. Y.

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AES MEMBERSHIP REPORT

ELECTIONS

Baltimore-Washington: M. H. Newman
Bridgeport: H. W. Hamill
Buffalo: C. O. Block, A. E. Grazen, A. M. Gritzmacher, E. V. Hess, G. W. Perry, J. Tiebor
Capitol District: L. E. Hibbs
Chicago: K. Bass, J. Dunn, J. L. Maple, J. H. O'Leary, L. N. Peterson, E. R. Stevens, C. R. Stoltzner
Dayton: T. T. Morrison
Detroit: R. J. Amis, R. Barnes, A. Klimecki, S. S. Wilson
Grand Rapids: C. R. Barkhurst, K. Brink, K. P. Holmes, N. W. Schall, G. Schripsema, A. C. Snyder
Hartford: L. J. Denis, L. A. Pierce, P. I. Rogers, J. G. Stefurak, A. J. Tycz
Los Angeles: R. B. Grey
Louisville: H. C. Barnes, Jr., T. M. Brentlinger, T. O. Buckman
Milwaukee: E. M. Christian, G. A. Malmstrom
Newark: W. P. Alina, F. E. Klemm, H. J. Picard, A. Richards, M. H. Ross, W. S. Wilkinson
Portland: D. Tweed
Providence-Attleboro: R. Marchionda
Rochester: J. J. Cipolla, H. E. Prevost, N. Ribaudo
St. Joseph Valley: M. M. Becknell
St. Louis: G. S. Clooney
San Antonio: C. M. Cole
Southeastern: F. S. Middleton
Sydney: H. W. Conolly, C. H. Hamcock, J. L. Sheaffer, A. R. Wales
Syracuse: Josephine LeRoy, L. S. Misenti
Toledo: J. L. Morrow, D. Wilczynski
Toronto: W. D. Christianson, T. Pelshea
Member-at-Large: T. O. D. Craig, Surrey, England, R. F. Nardini, Niagara Falls, New York, W. Schafroth, Herrin, Illinois, E. A. Walters, Sidney, Ohio, R. Wilhelm, Los Alamos, New Mexico

REINSTATEMENTS

Detroit: W. B. Knight, Jr., E. J. Prozaki, M. Wallace
Los Angeles: B. C. Gardes
Montreal: J. L. Hoaking
Newark: Steven Leshnick, M. Pearisi, S. Yacus
Pittsburgh: J. E. Jones, R. H. Smith, D. W. Tuckwiller
Toledo: J. Morrow (returned from armed forces)

TRANSFERS

Baltimore-Washington: M. L. Kronenberg, to Chicago Branch
Bridgeport: J. Ivanits, from Springfield, J. Simon to Los Angeles
Chicago: M. L. Kronenberg, from Baltimore-Washington, C. B. Sanborn, to Newark
Columbus: J. E. Bride, to Cleveland
Detroit: V. E. Diehl to Buffalo
Grand Rapids: F. W. Cook to Detroit
Indianapolis: R. W. Priddis from Philadelphia, D. Sivertsen from Newark
St. Joseph Valley: W. Manson from New York
Syracuse: D. H. Morris to Chicago
Member-at-Large: R. E. Cook to Indianapolis

RESIGNATIONS

Melbourne: N. Gosling, T. J. Hollinrake, R. H. Keller, S. B. Pearce
Newark: H. Sievering
Toronto: T. Palvio
Member-at-Large: S. Wilson

SUSPENSIONS

Buffalo: J. R. Boylan, C. J. Fadale, M. J. Holmes, K. R. Humes, C. J. Menzemer, M. Sender, K. A. Smiley, H. Vander Horst, J. Wiarda
Detroit: J. D. Jones, J. M. Kaelin, J. H. Ketko, L. B. LaForce, A. A. Lumetta, T. J. Orr
Hartford: A. Burman, J. Cicarcia, J. Leahy, C. Negrelli, S. Russo
Milwaukee: A. Cook, L. Stetzer
Newark: R. F. Fowler
New York: S. J. Aburno, T. Allison, F. Bernier, W. Bramson, H. Brooker, R. Corey, V. G. Court, J. Ewing, R. Fuller, F. Gill, K. Green, J. Kushner, C. T. Lambert, A. MacKay, H. J. Martin, S. Maynard, L. B. Nerheim, F. Schmidt, M. H. Smith, L. F. Soderberg, M. Stangl, P. Stevens, W. Strein, T. Y. Sussking, F. Taylor
Portland: H. Hanson, D. O'Neill, P. Staub
Syracuse: J. Benson, H. J. Crouse, J. Early, C. Harris, R. L. Howard, A. W. Sweet, A. H. Walker
Toronto: V. Allen, B. Cowan, R. G. Haacke, D Larsen, A. W. Medina, S. J. N. Throop, J. W Westcott
Waterbury: W. R. McFarland

DEATHS

Baltimore-Washington: T. F. Slattery
Chicago: H. Faint
Detroit: W. R. Ivers
Hartford: N. Farrington
Newark: R. Doucette
St. Louis: F. Feeherty

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BRANCH NEWS

ALLENTOWN-READING

Plating Staff Photo

Allentown-Reading branch officers chat with National 2nd Vice-President F. T. Eddy on February 23. Left to right: John H. Ulrich, branch 2nd Vice President; Lee Kreider, Branch President; Eddy; and Edgar Iobst, Jr., Branch Secretary-Treasurer

The regular monthly meeting of the branch was held at Scotty's Anchorage, Second and Main Streets, Emmaus, Pa.

The president, **Leroy Kreider,** opened the meeting with the introduction of members and guests. The secretary's report of the previous meeting and the treasurer's report were read and approved.

Kreider read new correspondence to the branch which included a letter from **Dr. Heiman.** Dr. Heiman requested to receive notices of the branch's meetings in order to arrange a visit to the branch.

Howard Shearer thanked the branch for the flowers sent in expression of sympathy.

Under old business the members reported on their membership contacts. The members requested that the meeting notices be sent out earlier. **Peter Kovatis,** executive secretary of the society, said the national office would be glad to send out our meeting notices to eliminate paying a business service. A discussion was held on the merits of the present meeting versus the old meeting night. **Larry McMichael** made a motion which was seconded by **Fred Fleischman** to keep the meeting night the fourth Thursday of the month.

Kreider then appointed a nominating committee consisting of: **Carl Swartz,** chairman, Howard Shearer, and James Riegel.

An informal discussion was held on methods to improve attendance and interest at meetings. The following suggestions were made by the members:

1. Make a yearly roster of membership and meetings.
2. Have meeting notices give program of the next two meetings.
3. Have movies of the 1955 World Series at the next meeting.
4. Have the society's first vice-president install the new officers.
5. Do not have all technical meetings, or combine the technical with non-technical.

Kovatis suggested the president appoint a membership committee to set up a plan for increasing the membership of the branch. The president appointed the following committee: **Robert Southworth,** chairman, **John Ulrich,** Larry McMichael, Fred Fleischman, and **Harold Bowen.**

Kreider then turned the meeting over to Kovatis who spoke on obtaining membership and then introduced the speaker of the evening, **Francis P. Eddy,** third vice-president of the Society. Eddy's topic was, "How to Plan and Program More Interesting Meetings." Eddy stressed the need of strong leadership, getting the members in the habit of attending meetings, establishing committees and having them report at each meeting, starting meetings on time, obtaining publicity for meetings and the branch, having variation in meeting programs and setting up a yearly program, and making a point of having each member participate in the meetings. He also emphasized the necessity of each member having the desire to contribute to the Society; the growth of the Society is a community effort.

A discussion period followed the talk after which the members stood in silent reverence in honor of **Dr. Richard Wick** who passed away during the past weekend.

The meeting adjourned at 10:35 P.M. —E. H. Iobst, Jr., Sect.

BALTIMORE-WASHINGTON

A Movie, Refreshments, and a Movie

The February meeting of the Baltimore-Washington branch was held in the chemistry lecture room in the chemistry building at the National Bureau of Standards.

The only order of business was the election of **Milton H. Newman** to membership.

The educational session consisted of two movies. The first "Mining for Nickel," was a 45-minute sound and color film sponsored by the International Nickel Company, Inc. This movie combined animation with its live action photography to clarify further the methods used. It does an excellent job of telling the story of mining for nickel from the search for the ore and the way it is located to the basic development of a mine and the six different mining methods used by Inco to extract the ore.

During the intermission, following the showing of this film, the branch was served refreshments consisting of some very tasty sandwiches, coffee and cokes. Credit for this treat is due **Dr. Wood** and her committee.

The second movie, "Science of Making Brass," was a 29-minute sound and color film depicting the manufacturing processes involved in making the various brass items produced by the Chase Brass and Copper Company. It begins with the refining of the ores and the mixing of the metals to form the correct alloys, then follows the casting of the billets and the rolling of the metal into bars and sheets. Next was the drawing of wire and tubes, the forming of tubes by the piercing method and the forming of odd shapes by extrusion. The picture ends with the showing of finished samples of their various products.

Both of these pictures are well worth seeing.

Carl H. Thiede, Secretary

BUFFALO

Committee Reports on Empire State Regional

The February meeting of the Buffalo branch was held Friday February 3, in the Hotel Markeen. The committee for the Empire State Regional Meeting April 14, reported that most of the arrangements for the meeting are complete.

On the program will be: **Howard McAleer,** Formax Mfg. Co., Detroit, Mich.—"Polishing and Buffing Materials and their Applications." **Edward C. Bertucio,** Mutual Chemical Div. Allied Chemical & Dye Corp.,—"Interesting Applications of Chromium Plating." **Dr. Louis Weisberg,** Electroplating Consultant, New York.

The following were admitted to membership in the Buffalo branch: **George W. Perry,** Hamburg, N. Y.; **Edward V. Hess,** Buffalo, N. Y.; **Albert M. Gritzmacher,** Lockport, N. Y.; **Alfred E. Grazen,** Buffalo, 20, N. Y.; **Carlton O. Block,** Buffalo, 13, N. Y.; and **John E. Tiebor,** Tonawanda, N. Y.

Two applications for membership were read and submitted to the board of managers.

Harold L. Mitchell, technical director of the Chemical Corp., spoke on the subject "Chromate Conversion Coatings."

Eric G. Sampson, Jr., Secretary

BRIDGEPORT

The regularly scheduled business meeting and educational session of the Bridgeport branch, AES, was held in the main ballroom of the Hotel Barnum on Friday, January 13, 1956. The meeting was called to order at 8:23 P.M. by the acting president **Robert Bonazzo.**

Richard Barrett, chairman, reported at length as to the respective responsibilities of each member branch of the Northeastern Regional, on the estimated costs involved and that the menu for the dinner had been selected. **Wm. Lindsay,** vice-chairman, reported that the entertainment program had been arranged at considerable expenditure but was of high quality. **P. Bailin** stated that the Bridgeport branch, through its com-

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mittee, had pledged the sale of at least 110 tickets and that they were to be obtained from the branch secretary. **F. Tatum** advised that seating would be arranged in multiples of ten and that every effort would be made to allocate seating so that each area would contain a cross-section of representation by the branches.

W. Ehrencrona, chairman, Olde Tymers Nyte, reported that the affair is scheduled for Saturday, February 18, 1956. An excellent Smorgasbord with all the trimmings, including your favorite beverage, would be featured as well as the opportunity to indulge in various games of skill. The location is The Viking Hall, Alfred St., Bridgeport, Conn. The announcement of the affair would include a stamped, self-addressed postal card which should be properly completed and forwarded to Bill. This is for the purpose of correctly estimating the number of members and guests anticipated and provide for same.

The tabled discussion of the board of managers' recommendation about raising the dues was reopened. Bill Lindsay made a motion that it be sent back to the board for reconsideration. It was so voted.

It was agreed that the business meeting scheduled for February, so often cancelled because of the Olde Tymers Nyte date, be definitely held this year.

A motion was made and passed that a suitable offering would be made at all future meetings to an attending member who, through his efforts, would be designated the recipient. The resulting offering would be through the combined efforts of those in attendance.

Joseph Simon, president, wrote the secretary and his letter was read to the group. He was happy in his new job and surroundings; however, he missed the bunch back home. His letter included a request for transfer to the Los Angeles branch.

The New England Regional, through R. Barrett, invited the acting president, Robert Bonazzo, to be present at the forthcoming committee meeting scheduled for February 8, 1956.

At 9:23 P.M. the meeting was turned over to **Michael Tamas,** librarian, who introduced the featured speaker of the evening, **Dr. Fred Lowenheim** of Metal and Thermit. Dr. Lowenheim chose for his topic, "New Developments in Tin and Tin Alloy Plating." Supplementing his talks with slides, he mentioned that a deposit of tin-copper-bronze may be substituted mil for mil for nickel. The work of section E of ASTM B-8 Committee was concerned with the performance of tin and tin alloy coatings. They were particularly interested in the solderability of the coating as well as the corrosion factors.

After a lively question and answer period, the meeting was adjourned at 10:08 P.M. Refreshments were then served and television viewing of the current Friday Night fight was also presented for those who were interested.

The February meeting of the Bridgeport branch was held on Friday, February 10 in the main ballroom of the Hotel Barnum with 35 members and guests present.

Applications for membership were received from **Carl Annecharico,** Ansonia, Conn.; **Martin J. Sondej,** Stamford, Conn.; **Henry J. Honcz,** Stamford, Conn.; **Benjamine Sorrentino,** Bridgeport, Conn. **H. Winton Hamill,** Trumbull, Conn. was accepted as an active member.

R. Barrett, chairman, New England Regional, reported that publicity had been decided on and distributed to the various trade journals for publication; that the last committee meeting had been attended by R. Bonazzo, Floyd Tatum and himself; that present indications were that a profit higher than anticipated is in view, due to an increase in procured advertising and that a greater attendance is probable. F. Tatum urged the Bridgeport members to give the affair their wholehearted support, and that an excellent entertainment program had been arranged. R. Bonazzo reemphasized that the regional was deserving of all the Bridgeport members' attendance.

Ray Goral had been confined in the Bridgeport Hospital and had undergone an operation which, thought not serious, was very painful.

Nomination of officers: president, **R. Bonazzo, A. Ferguson;** 1st vice-president, **Floyd Tatum;** second vice-president, **M. Tamas;** librarian, **C. Bryan, W. Lindsay;** secretary-treasurer, **R. Parker;** sergeant-at-arms, **H. Maskowski;** board of managers, **W. Ehrencrona, H. Braun, P. Bailin, R. Goral, W. Lindsay;** delegates, **R. Barrett, C. Temple, F. Richard;** and alternates, **C. Sievert, F. Tatum, R. Goral.**

H. G. Rice, veteran member of the AES asked for a demit from the Society. His retirement from his business connection, after 50 years of service, was the reason offered. W. Lindsay made a motion to have the board of managers investigate the report that he had been a member of the Society for the past 30 years. If this be true, it was suggested than an honorary membership be conferred on him.

The matter of raising the dues had been returned to the board of managers for reconsideration. They reported that they are withdrawing their recommendation for same.

The question concerning the possible sponsorship by the branch of an electroplating course of study was offered to the attending members for discussion. After considerable discussion as to its acceptability in this area, as well as the approach and scope of its curriculum, the acting president, R. Bonazzo, asked for volunteers to determine the advisability of furthering the project. C. Bryan, **T. Sullivan** and B. Parker volunteered their services. At adjournment time, H. Winton Hamill, newly inducted member, was designated the winner of the door prize.

BOB PARKER, Secretary-Treasurer

CAPITOL DISTRICT

Bob Watson on Fe and Porous Cr Plating

The Capitol District branch held its regular monthly dinner-meeting on February 6 at Panetta's restaurant in Menands.

The scheduled speaker, **Clifford Struyk** of the General Chemical Division of Allied Chemical and Dye Corp., was unable to attend because of illness. However, **Bob Watson,** technical representative of Van der Horst Corp. gave an excellent impromptu talk on the Van der Horst iron plating process and their porous chrome process.

Their iron plating process is accomplished in a very stable bath which permits heavy build-up on all the common base metals. An iron deposit up to 0.200 inch thick can be plated on steel while cast iron can be built up 0.100 inch in thickness. This heavy deposition is accomplished by double plating. The deposit is brittle as plated but the ductility is improved by heat treating. A panel whose thickness has been increased to 0.300 inch with the Van der Horst iron plate can be bent 120° before fracture begins. The bath is being used very successfully in many repair shops throughout the country.

The Van der Horst porous chrome processs is a patented process which uses a standard chromic acid plating bath and a reverse etch to impart the porous structure. The parts are usually overplated from 0.001 inch to 0.002 inch, then reverse etched, and finally honed to size. The porosity can be controlled between 25 and 40 per cent. Porous chrome is being plated on railroad cylinders, piston rods and on various parts where an oil reservoir is desirable.

During the business meeting president **Paul Callahan** stated that the branch will not have a meeting in April because of the joint NACE-AES meeting on March 26. Therefore, the election of officers will have to be held at our next meeting on March 5 or else the membership can vote by mail.

Zygamond Nash presented **Chester Klimek,** chairman of the research finance committee, with a $100.00 check along with an application from Sprague Electric for a sustaining membership.

Edwin Frieberg, Jr., chairman of the 1957 Christmas Party Committee, asked the membership about how elaborate a Christmas Party they desired.

The business meeting was abbreviated somewhat because of the very treacherous driving conditions.

CHARLES SCHENK, JR., Secretary

CHICAGO

Technical Discussions by Vanden Berg, Smith, Scheel and Corré

On February 10 an interested and enthusiastic group of members and guests attended the monthly meeting of Chicago branch, AES, held at the Western Society of Engineers clubrooms in Chicago.

Vanden Berg

In line with their program of broadened coverage and intelligent inquiry into modern methods, materials and finishes, the speaker of the evening was **Russell V. Vanden Berg,** manager of the Finishes Section—Process Development Laboratories of Aluminum Company of America. Vanden Berg, an extremely capable speaker, discussed both electroplated and anodic finishes on aluminum.

Devoting the first portion of his talk to electroplating on aluminum, he pointed out the many advantages and drawbacks of electrodeposited coatings on aluminum, calling special attention to the fact that though there are many good reasons for plating on aluminum, one should never plate on aluminum for corrosion protection. Following these words of caution, he discussed the historical background and the current practice of plating on aluminum. The portion covering anodic coatings was well illustrated by the showing of an excellent set of slides accompanied by appropriate remarks.

Following the talk he was bombarded with questions. Those of general interest were:

1. What is the life of a zincate bath? Vanden Berg replied that the life of the bath is indefinite if it is properly maintained, but, he cautioned that additions to the bath should be made using a prepared zincate solution.

2. Is there a correlation between fadeometer tests on dyed anodic films and atmospheric exposure? His answer stated that there was none because atmospheric conditions vary so widely.

3. How can aluminum be hard chromium plated? Vanden Berg replied that aluminum could be hard chromium plated by the use of the conventional cycle, with a copper flash.

Unquestionably the good attention and the large number of questions asked of Vanden Berg is a good indication of the interest in the subject and the high quality of the speaker.

Preceding the technical portion of the meeting, officers and members in a business session gave special attention to the ladies in planning and anticipation of the Annual Ladies Night Meeting in April. From the discussion it appears that everyone will look forward to a Big Night.

Members heard with regret of the passing of **Bill Varnish,** an active and long-time member of Chicago branch.

Members of the February panel of experts were: **Ed Smith,** George A. Stutz Mfg. Co. on Plating Equipment; **Bob Scheel,** Heil Process Equipment Corporation on Corrosion Resistant Equipment; **Joseph Corré,** American Phenolic Corporation on Coloring Anodic Coatings.

They handled some interesting questions.

JEROME KUDERNA, Publicity Chairman

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BRANCH NEWS

COLUMBUS

AES Public Relations Committee Visits

The regular monthly meeting of the Columbus branch AES was held at Battelle Memorial Institute on Friday, February 3.

President **Nathan Koslin** called the meeting to order at 8:00 P.M.

The minutes of the December and January meetings were read and approved.

President Koslin then called upon AES executive secretary **P. Peter Kovatis** and asked him to introduce visiting members of the AES public relations committee. Kovatis introduced PLATING advertising manager **H. George Burnley**; AES past-president **Cleve F. Nixon,** and **Louis Glassner.**

Tri-state representative **Walter Denney** announced that tickets were available for the annual Tri-state regional meeting to be held at Dayton on March 10.

Librarian **George Skelly** introduced the speaker of the evening, **Louis J. Nowacki** of Battelle, whose subject was "Paints in Relation to Metal Finishing."

There followed a question and answer session and a round of applause for the speaker.

Librarian George Skelly announced that the speaker for the March meeting will be **Edward C. Bertucio** of Mutual Chemical Company, whose subject will be "Special Applications of Chromium Plating." An added attraction will be a film on chemical milling, through the courtesy of North American Aviation.

There being no further business, the meeting was adjourned in favor of coffee and donuts by **Les McGraw.**

MICHAEL FARR, JR., Secretary

DAYTON

Anodizing and High Temperature

The regular February meeting was opened at 8:00 P.M. by chairman **Ralph Collins** at the Biltmore Hotel.

The application of **Thomas T. Morrison** was accepted. **Fred Bauch** reported that Frigidaire would not be working on Saturday, March 10 and that a plant tour of the McCall Corp. would be substituted for the coming Tri-State meeting. Chairman **Bob Ruleff** reported that ticket sales are unprecedented and that upwards to 900 are expected for the Tri-State event.

Fred Bauch, Dayton branch member of the Frigidaire Div., GMC, then presented a paper "Design of Racks for Anodizing." Afterwards the main speaker for the evening was introduced, **C. B. Hartley** of the High Temperature Materials Laboratory, Wright Air Development Center. He presented a very interesting paper "Current Status of High Temperature Materials for Aircraft Applications."

Refreshments after the meeting were through the courtesy of the branch.

R. M. CLINEHENS, Secretary

DETROIT

A Thousand Hands and Nominations

The February meeting of the Detroit branch was held in the Michigan Room of the Statler Hotel on February 3.

A very interesting movie, "The Man with the Thousand Hands," sponsored by the International Harvester Company started the meeting at 8:00 P.M. This is a colored film of the story of the Kinamett Aluminum project in Canada.

President **Lee Morse** officially opened the meeting at 9:05 P.M. **Joe Gurski,** nominating committee chairman, submitted the following nominations for officers for the 1956–57 Society year:

President, **Howard McAleer**; 1st vice-president, **Bob Racine**; 2nd vice-president, **Glenn Friedt, Jr.**; secretary-treasurer, **Ed Kubis**; educational chairman, **Doug Thomas** and board of managers, **Guy Cummings, Jr.**

C. D. Sparling was given credit for the fifth new sustaining member of the year, Alco Chemical Company.

Lee Morse announced that the next month's meeting will be ladies night. Joe Gurski will speak on his recent trip to Europe.

Glen Friedt, Jr., technical chairman of the evening, introduced the speaker of the evening, Howard McAleer of Formax Manufacturing Co. The title of his talk was "Polishing and Buffing Materials and their Application." Howard gave a very interesting talk in which he used slides taken on his Mexican vacation showing the sisal industry.

PATRICK J. DRISCOLL

GRAND RAPIDS

Annual Educational Session and Dinner Dance

The 18th annual educational session and dinner dance of the Grand Rapids branch was held at the Pantlind hotel, February 11 and was heralded as one of the most successful in branch history. Despite bad weather, a large number of members and guests from Grand Rapids and surrounding branches were present.

Librarian **John Dykstra** introduced an innovation in educational sessions by adopting the theme of "Human Relations." The sessions were presided over by national president **Clyde Kelly** who gave the members an interesting tour through the new PLATING and national headquarters offices by means of color slides. Kelly then introduced the first speaker, **Paul Moore,** executive vice-president of the American Society of Personnel Administration whose subject was "New Horizons for Management." Moore pointed out how industrial management has been developing through two stages during the past fifty years and is currently beginning a third phase. It has progressed from a motive of force and fear to the present day motive characterized by an honest, sincere effort at good human relations and is now just beginning the third phase, that of "participation" with employees. Moore was very optimistic about this new horizon for management and stated that in the few industries where it has been tried, the results have been nothing short of miraculous. Moore then discussed the requisites for good supervision and how they may be developed.

At noon, the members and guests enjoyed a delicious luncheon in the Kent State Room sponsored by the Fredrick B. Stevens Company.

Branch Officers and Guest Speakers during Luncheon at Grand Rapids Branch Annual

Following the luncheon, president Kelly introduced the second speaker, **Kenneth Yost,** director of human relations for the National Metal Trades Association whose subject was "The Positive Approach to Good Human Relations." Yost dramatically pointed out how important constructive thinking is for present day management. He stated that management's emphasis on expediency cannot help to achieve peace and tranquillity in industrial relations and offered a vision of unlimited heights of success and prosperity to those who approach their problems with a constructive, positive attitude.

It is with a great deal of pride that the Grand Rapids branch congratulates librarian John Dykstra, chairman Clyde Kelly and the speakers for the excellent program that they presented.

At seven in the evening, the members, guests and their wives enjoyed a banquet and floor show in the main ballroom. The ladies were delighted with the favors of wrought iron television lamps which were selected by the favor chairman, **Carl Green.**

Congratulations are also due to **Bob Blackford,** the banquet

chairman, **Paul Waalkes,** entertainment chairman, **Jack Hanney,** ticket chairman, and **Donald Smith,** program chairman for a fine party and a wonderful time.

Also worthy of mention was a very impressive display with pictures of the plants of sustaining member firms in the Grand Rapids area, prepared by **Richard Watson.**

THOMAS C. HENNER, Publicity chairman

HARTFORD

Murray on Stripping

The regular branch meeting was held at the Bond hotel on February 20 and about 58 members and guests were present. Preceding the meeting a colored movie entitled "Down in Texas" was shown.

The guest speaker for the evening was **William Murray,** technical service engineer, Enthone, Inc. whose subject was "Stripping of Electrodeposits."

Murray briefly described the known methods of stripping deposits in alkaline solutions with the use of reverse current and an improved sodium nitrate bath for removing nickel deposits. Also reverse current stripping in acid baths was discussed with a recent development of one solution for stripping copper, chrome and nickel.

Simple immersion solutions for metal stripping were covered with some discussion on recent baths using organic oxidizing agents (nitroaromatics) for removing nickel in both acid and alkaline baths.

The technical chairman for the evening was **Walter Acker.**

STANLEY PLATOZ, Secretary

LOS ANGELES

Lively Meeting and a New Slate

The regular monthly meeting of the Los Angeles branch was held on Wednesday evening February 8 at the Rodger Young Auditorium with 95 members and guests in attendance. The meeting was called to order by president **Arnold** at 8:30 P.M. after which **Pete Esten** the sergeant-at-arms introduced the guests present. The secretary's report was then read and approved. Vice-president **Stoner,** our membership chairman, introduced six new candidates for membership. He also introduced **Bernie Gardes,** a charter member of the Los Angeles branch who was reinstated after a long absence, and one new member was elected to the branch.

Research chairman **Tony Stabile** reported that the branch now has 19 sustaining members. A special report of the executive committee was given by **Glen Beckwith** with special emphasis on the forthcoming National Convention and the bid by the Los Angeles branch for the 1960 convention site, and the work that will have to be done by all the delegates and members who will attend the 1956 convention in Washington.

President Arnold read an invitation extended to the members of the Los Angeles branch from **Dr. James Rich** to attend the meeting of the "B-8 Committee on Electrodeposited Metallic Coatings" of the ASTM to be held in September.

It was reported that one of our older members, **D. Eldred,** had suffered a heart attack early in the week and is confined to the Santa Teresita Sanatoruim where he is resting very comfortably.

The nominating committee, comprised of **Stu Krentel, Earl Coffin** and **Al Sulzinger,** offered the following slate of officers to be voted on at the March meeting: president, **Truman Stoner;** 1st vice-president, **George Magurean;** 2nd vice-president, **Norman K. McEwan;** secretary, **Frank Virgil;** treasurer, **George J. Hetz;** librarian, **Emmett H. Babcock;** and board of managers, **Earl Arnold, Harvey Hunt** and **Tony Stabile.**

It was pointed out by Stu Krentel that the above were recommendations only and that nominations will be accepted from the floor on election night March 14.

The meeting was then turned over to the librarian, Norm McEwan, who introduced the speakers for the evening. **"Mike" Raskin** was moderator with a panel of experts comprised of **Bob Coombs, Norm Dieball, Earl Swienhart** and **Harold Smallman.** The topic for discussion was "Maintenance of Electrical Equipment in the Plating Room." The discussion was a lively one making the meeting one of the best of our current season. President Arnold adjourned the meeting at 10:00 P.M.

GEORGE J. HETZ, Secretary

LOUISVILLE

Letters from Wysong and P P K

The regular monthly meeting of the Louisville branch was held Thursday January 19, at Kapfhammers Party House, Louisville, with a dinner served at 6:30 P.M. First vice-president, **Ken C. Reifsteck** opened the business and open meeting at 8:00 P.M. with 18 members and guests present.

James R. Smith, delegate to the Tri-State regional meeting, submitted a report of the Tri-State region to our members. The meeting will be held at the Dayton Biltmore Hotel at Dayton, Ohio on March 10. The educational session will be held at 1:30 P.M. and the banquet and entertainment at 7:00 P.M. Tickets are $6.50 per person and can be purchased from **J. R. Smith** or **R. G. Marshall.**

A letter has been received from the St. Joseph Valley branch asking the Louisville branch to support their member **Ralph D. Wysong** for the 3rd vice-president at the National Convention in June 1956. The letter was ordered to be placed on file.

A letter has come from the executive secretary, **P. Peter Kovatis,** requesting a report of the history of the Louisville branch. Vice-president, K. C. Reifsteck appointed **S. J. Beyer** to write up a resume on the history of the Louisville branch and submit same to the executive secretary.

Ed Bruck of the Indianapolis branch gave us a report on the Regional meeting to be held in Indianapolis, Indiana next year. There also will be a banquet and technical session held on April 28, and tickets are available at $7.50 per person.

R. G. Marshall reported that at this time a junior delegate is to be appointed by the Louisville branch for the new regional meeting which will be held in Indianapolis in 1957.

The technical sessions committee had no speaker scheduled for tonight, so we had two films shown, "The Melting and Refining of Stainless Steel" and "How Else Would You Make It—Die Castings." Both of these pictures proved to be very interesting. The meeting was adjourned at 10:00 P.M.

J. G. STEBLING, Secretary-Treasurer

MELBOURNE

TV Lecture and Old President is Thanked by New President

The 11th annual meeting was chaired by the president, **Tikotin,** 37 members and friends being present. The auditor's report and balance sheet were tabled and the items with regard to the library and entertainment expenses were discussed and will be brought up at a later meeting.

The president reported that the financial position is slightly more fluid than last year and Tikotin thanked the committee for their support during the year, especially secretary **Reaburn,** and **J. J. Dale** for the lecture programs and general assistance.

Extracurricular functions were not as well attended as we could desire, but all were quite successful. The scope for increase in membership is still considerable but a vigorous publicity policy may be necessary to obtain the desired results.

The voting for office bearers was preferential and secret and it was pleasing to note that so many were nominated.

Films were shown to indicate the methods of recording, transmitting, and receiving televised material when **C. Davy,** F.M.T.C., A.M.I.R.E., senior instructor in television and radio navigational aids at the Royal Melbourne Technical College, lectured on television. Limitation and difficulties so far inseparable from television were enumerated and discussed.

The new president thanked the retiring president for his efforts last year then the meeting closed at 10:30 P.M.

BRANCH NEWS

MILWAUKEE ANNUAL PARTY

Schroeder Hotel, Milwaukee, Wisconsin
April 28, 1956

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SCHEDULE OF EVENTS

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TECHNICAL SESSION

Technical Sessions: 9:30 A.M. to 12:30 P.M.
Cocktails: 12:30 P.M. to 1:30 P.M.
Luncheon: 1:30 P.M. to 3:00 P.M.
Clyde Kelly report during luncheon
NO AFTERNOON SESSIONS
Banquet and Entertainment 7:00 P.M.

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THE THEME IS:
PLATING FOR PRECISION, PERFECTION AND PROFIT.

• • •

TECHNICAL SESSION

Clarence H. Sample
In charge of Electroplating for International Nickel.
"History and Importance of Specifications in Electroplating."

Dr. R. B. Saltonstall
Technical Director of the Udylite Corp., and Secretary of B-8 Committee for ASTM
"Producing and Testing Specification Plating."

Lloyd O. Gilbert
Chief chemist of the Metal Finishing Laboratory of the Rock Island Arsenal.
"Some Experiences of Government Agencies in Purchasing Specification Plating. Case Histories, Troubles and Solutions."

• • •

LUNCHEON SESSION

Clyde Kelly
National President of the AES will give a short report on the Activities of the Society.

• • •

COMMITTEE CHAIRMEN

General Chairman	E. N. Robinson
Advisory	Leslie Diveley and Art Linn
Educational	Juel O. Severson
Banquet and Hotel	Phil Ritzenthaler
Luncheon	Glen Schwemer
Hotel	Henry Bornitzke and Arvin Piepenhagen
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MILWAUKEE

"Plating and Specifications" —Theme of Annual Meeting

President **H. Tessman** gaveled the February meeting to order with about 55 people present. Two applicants were accepted as new members—**Gilbert Malmstrom** and **Ervin Christian.** Appointments made by the president were to the nominating committee and the names of **G. Schwemer, L. Diveley,** and **P. Ritzenthaler** were listed. **H. Bornitzke** was appointed to the post of branch historian for the purpose of assembling a current history of the branch.

The membership was informed that Plating Engineering Co., Milwaukee, had joined the ranks of sustaining members during the month of January. Delegates to the convention will be appointed at the next regular meeting. The chairman of the annual meeting, **Red Robinson,** assured us that the meeting was shaping up fine and that the librarian **J. Severson** had an excellent educational session planned. The theme would be "Plating and Specifications," and the speakers would include **Clarence Sample,** of Inco, AES president **Clyde Kelly, Dr. R. Saltonstall** of Udylite Corp. and **L. Gilbert** of Rock Island Arsenal.

The speaker for the evening was **Edward Pieters,** of Process Engineers Co. Pieters spoke on plating with nickel sulfamate baths. The various properties of the sulfamate bath were discussed and illustrated with slides and numerous samples of nickel-plated objects. After the speech the membership participated in a lively and lengthy discussion period. The meeting was then adjourned and refreshments were enjoyed through the courtesy of the Milwaukee branch.

C. PETER, Secretary-Treasurer

MISSISSIPPI VALLEY

A Vigorous Branch Hears a Talk by Kahler

The Mississippi Valley branch held their February 15 meeting at the Tower Restaurant in Moline, Ill. The meeting was preceded by a dinner which was served at 6:30 P.M.

The regular meeting was called to order at 8:20 by **Lloyd O. Gilbert,** chairman, who immediately called upon **John Hartman,** librarian, to introduce the speaker of the evening.

Hartman presented **Harold Kahler** of the Promat Division of Poor and Co.

Kahler's talk was entitled "Modern Trends of Cadmium and Zinc Plating." He began his talk with a history of cadmium and zinc plating. In 1817 Stromeyer discovered cadmium and the first cadmium plating bath was made in 1841 by dissolving cadmium carbonate in sodium cyanide. Zinc is a very ancient metal dating back to the pre-Christian era. In 1741 the application of "hot-dip" zinc was accomplished by a French chemist; but, it wasn't until 1916, that zinc was applied commercially from a plating bath. Both of the metals protect steel parts in two ways. First, they cover the metal and act as a mechanical barrier. Second, they protect by an electrochemical process. This latter method may be explained in that these electrodeposited coatings are anodic to the basis metal and are therefore sacrificial.

Cadmium is now mainly deposited from a cyanide bath, while zinc may be deposited either by a cyanide or an acid bath.

Mild steel or rubber-lined tanks may be used. An advantage of the rubber-lined tanks is that stray currents are eliminated.

Cathode agitation is strongly recommended. Adequate precleaning is of paramount importance. Modern trends are towards higher and higher current densities. In cadmium baths, it is desirable to maintain a cyanide to metal ratio of 3.5 to 1. Important factors in proper operation of cadmium plating solutions are sodium cyanide content and anode cathode relation-

ship. Typical formulas of both cadmium and zinc plating solutions were given, and it was pointed out that many of the greatest causes of carbonate build-up in either of the baths are: absorption of carbon dioxide from the air; drag-in from other baths; too-high operating temperature.

The best way for carbonate removal is by cooling the bath, thus precipitating out the sodium carbonate. Separation is then effected by decantation.

Addition agents accomplish the following in zinc and plating baths: refine to crystal size; give greater tolerance for impurities; increase cyanide range; it is made possible to plating at current densities.

Both organic and metallic addition agents are used.

In regard to supplementary treatments, there is one school of thought that feels that the hexavalent chrome in the coating is the factor responsible for increased corrosion resistance. However, in Kahler's opinion, a coating containing supplementary protection of materials containing a ratio of trivalent chrome to hexavalent chrome of 5 to 1 serves as a better paint base and he suspects that it also offers more protection when unpainted. When supplementary coatings are to be leached, the use of inhibited sodium hydroxide is recommended. The inadequacy of the salt spray test for evaluating the quality of the coatings was related and much research is being done to develop a more satisfactory method.

The liveliness of the following question and answer session demonstrated the interest in the subject of the evening.

Gilbert expressed appreciation for the fine talk by Kahler, and proceeded to the business of the meeting.

The identification cards which we were wearing were supplied by Veith. A tentative schedule of speakers for the next few months has been set up which includes talks on "Metal Cleaning," "Functions of the American Electroplaters' Society," and "Water Purification and the Conservation of Cyanide."

Jacob Knanishu and **Donald Sale** were appointed publicity officers to replace **John Rowe** who resigned in January.

A nominating committee was appointed, namely: **John Mohr, H. J. Veith** and **Mr. Stoneking.**

The secretary read a letter from **Ezra Blount,** publicity chairman for the regional meeting of AES inviting our members to attend a program for the ASTM Symposium on "Properties, Tests and Performances of Electrodeposited Metallic Coatings" to be held February 29 at the Hotel Statler in Buffalo, N. Y. Also an announcement was made of the program for the annual Tri-State regional meeting of the AES to be held on March 10 in Dayton, Ohio.

A thirty-minute movie on fishing was shown by our second vice-president **Barney Nordblom.** Forty-one persons were in attendance. Meeting was adjourned at 10:30 P.M.

P. CHAMBERLAIN, Secretary-Treasurer

NEWARK

Arnold on Whiskers; Korbelak on Wire and Bertucio on Cr

The January 20 meeting of the Newark branch was held with all officers present. **Walter Alina** and **Henry Picard** were elected to membership. The members were saddened by **Tom Austin's** announcement of the death of **Roland Doucette** and **Edward Faint's** report of the death of a onetime president of the branch, **Louis O'Donnell.**

Gustave Bittrich introduced **Dodd Carr,** who as first speaker, presented a series of slides on the Newark branch electroplating course, covering members active in the work, topics covered, places meetings were held and statistics on students.

Sydney Arnold, Bell Telephone Laboratories, Inc. then discussed "Whisker Growths." He described the problems encountered by the telephone company due to whisker growth in equipment carefully handled to the extent of hermetically sealing the unit. These whiskers grow from plated coatings, especially zinc, cadmium and tin. As a result a rather complete study of the phenomenon was undertaken at Bell Labs including various plating baths and conditions, different thickness of coatings as well as vacuum evaporated metals, hot dip and sprayed coatings. Smooth surfaces and thicker coatings take longer to develop whiskers and the basis metal is important. Zinc-tin, zinc-cadmium and antimony also give whiskers, the phenomenon limited to electroplated coatings, sprayed evaporated coatings and cast material will yield whiskers, although zone refined metals and single crystals have not produced such growths. Waxes, oils, greases and silicones are not helpful and supplementary coatings do not eliminate whisker growths which appear to be metal single crystals nor is there an adequate explanation for this phenomenon yet. In addition to the more common offenders brass (65–35), Cs, Sb, Au, Fe, Pb, Mg, Ni, Pd, Pt, Ag, Ta, Ti and W have yielded whiskers. Although there was no enthusiasm among the platers to adhere to a specification calling for the deposition of single crystals, this well presented talk on a problem primarily associated with plated coatings was interesting to all present.

The February 17 meeting was held with president **Austin** presiding. Four new members—**Warren Wilkinson** of Hanson-Van Winkle-Munning, **Murray Ross** of Bell Laboratories, **Anthony Richards** of Jersey Plating Company and **Francis Klemm** of Kelite Corporation—were elected to membership and four applications were accepted. Secretary **Foulke** read a number of communications including one from the Newark chapter of the Red Cross for which a $25 contribution was voted.

Cliff Struyk reported on the technical societies' council program for March 29 on "Plant Rehabilitation" with **Val Peterson** as main speaker. **Dodd Carr** reported the second electroplating school will begin in February with much interest in this repeat course.

Frank England reported for the nominating committee **(R. Ehrhardt,** chairman and **Howard Cobb)** as follows: president, **Clifford Struyk;** 1st vice-president, **William Grigat;** 2nd vice-president, **Gustave Bittrich;** secretary, **Don Foulke;** treasurer, **George Wagner;** librarian, **Dodd Carr** and sergeant-at-arms, **Fred Meyer.**

The meeting was then turned over to librarian Gustave Bittrich who introduced the speakers of the evening.

Al Korbelak chose as his timely topic: "Plated Wiring." He brought out rather strongly two points, namely—that the use of good board quality is a very desirable factor, and the use of silver on these circuits should be avoided because of silver migration.

Edward C. Bertucio of Mutual Chemical Division of Allied Chemical & Dye Corporation spoke on "Some Interesting Applications of Chromium Plating." He pointed out that chromium finds much use in industry because of its hardness, low coefficient of fraction, and resistance to corrosion. He then described the application of chromium to diesel cylinder liners illustrating two processes, grit blasting prior to chromium plating and chromium plating followed by a pin point and channel type etching procedure. Both processes provide some space in the chromium plate for the lubricant. He claims that the chromium plating of the liners increases the service life by 60–90 per cent.

He also spoke on the plating of printing rolls and gun barrels. These are massive pieces and they require some unusual procedures. The life of printing rolls was increased to as high as 2½ million impressions. The increase in the service life of the gun barrels was purposely omitted.

Lantern slides and kodachromes were very interesting and completely rounded out the lecture.

D. GARDNER FOULKE, Secretary

BRANCH NEWS

NEW HAVEN

Ostrow on "Bright Brass Plating;"
Branch History Ready

The February 14 meeting of the branch was held at the Mason laboratory, Yale University.

President **William K. Murray** opened the meeting with the roll call of officers. Judging from the list of absentees, the perennial winter virus has taken its usual toll. The attendance was also poorer than usual.

American Electroplaters' Society
17th Annual New England Regional Meeting
April 7, 1956, Hotel Statler, Hartford, Conn.

The seventeenth annual New England Reginal Meeting of the American Electroplaters' Society will be held on Saturday, April 7 at the Hotel Statler in Hartford Connecticut, with the New Haven Branch acting as host. This year five branches will participate to make this regional meeting a Five Star affair, according to William K. Murray, General Chairman.

Robert J. Girard, Springfield Branch, chairman of the educational program has announced the following program of speakers:—

1. "Barrel Burnishing" by Arthur S. Kohler, Frederick Gumm Chemical Co. Inc., Kearny, N. J.
2. "Textiles for Buffing" by William Phillips, Deering Milliken Co.
3. "High Speed Bright Plating of Brass, Copper and Nickel in Barrels" by Barnet D. Ostrow, Lea-Ronal Inc., Jamaica, N. Y.

Concurrent with the educational session which will start at 2 P.M., there will be a special Ladies' Program consisting of Entertainment and Bingo games with prizes under the able direction of Julie P. Madzik, Hartford Branch. After the educational session and Ladies' Program, there will be the usual Dinner Dance starting at 6:30 P.M. in the Capitol Ballroom. Joseph McInerney of the Hartford Branch, has arranged an excellent entertainment program. Music will be supplied by William Glenny's orchestra as of last year.

Tickets for this FIVE STAR REGIONAL may be obtained at $6.00 per person from the secretaries of any of the following five branches: Waterbury, New Haven, Bridgeport, Springfield or Hartford.

A report on the New England Regional by the committee indicates that this event is destined to be a great success. Advertising, publicity, entertainment, and the educational programs all shaping up favorably. It is in the interest of all branch members to attend this annual function on April 7 and enjoy the festivities.

The application of **Joseph Aleksiewicz** was read and he was accepted as a new member.

The national headquarters has requested a branch history. Fortunately, our branch historian, **Walter R. Lynch** already has one written and it requires nothing more than the addition of contemporary events.

In the absence of our librarian, **Leo Roberti,** who was to have been the technical chairman, president Bill Murray took over and introduced the speaker of the evening, **Barnet D. Ostrow,** technical director of Lea-Ronal, Inc. who spoke on "Bright Brass Plating." The talk was well presented and supplemented by slides. The question and answer period revealed a fair interest in this type of plating and the answers given were helpful.

The evening door prize was donated by Lea-Ronal, Inc.

B. J. GAFFNEY, Secretary

NEW YORK

Five Top Speakers Make Annual
Educational Session Terrific

The New York annual educational session was held at the Hotel Sheraton-Astor on February 11. The first speaker was **Dr. D. G. Foulke** of Hanson-Van Winkle-Munning Co. who spoke on "New Developments in Leveling Nickel Processes." A new type of leveling bath was discussed, and data presented on the effects of current density, temperature, pH and agitation. Slides were also shown detailing theoretical mechanisms for the operation of these baths. Leveling is considered the result of increased polarization at the peaks as compared to the polarization in the valleys, leading to a new theory of leveling based on a difference in thickness of the diffusion layer at different points on the cathode. Photomicrographs indicate that the type of deposit obtained in the crevice differs from that obtained at the peak and polarization data show that addition agents which are effective leveling agents tend to greatly increase the cathode polarization. The addition agents are of the acetylenic-sulfonate type.

Foulke

The second speaker was **Dr. H. B. Linford** of Columbia University, who spoke on "A Shop Test for Determining Cleaning Time." It was found, as an outgrowth of work on AES Project 12, that a correlation exists between ease of alkaline cleaning and the rate of spread of an oil on a metal surface. A job plater can determine how long it will take to remove a soil by first cleaning metals of about three different soils. Degree of cleaning for a given time of plating is determined by the atomizer test. By extrapolation, time for 100 per cent cleanliness is determined.

EMPIRE STATE REGIONAL MEETING

At the Statler Hotel April 14, 1956. The speakers: Howard McAleer of Formax Mfg. Co. will talk on "Polishing and Buffing Materials and Their Application." Edward Bertucio of Mutual Chemical Div. Allied Chemical & Dye Corp. will talk on "Interesting Application of Chromium Plating." Dr. Louis Weisberg will talk on "Future Development in Electroplating."
A style show and tea for the ladies.
The banquet will be in the evening at the Statler Hotel.

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BRANCH NEWS

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The third speaker, **Jonathan Rintels,** of the Dept. of Commerce spoke on "The Priorities System and the Plating Industry." He first reviewed the priority system from 1950 to the present. He then detailed the present priorities system. Pertinent regulations and the nature of rated orders were discussed. The misuse of program identification symbols and rated orders can jeopardize fulfillment of military and AEC requirements. The activities of the Compliance and Enforcement staff of BDSA were outlined. The speaker concluded by pointing out five ways in which platers can insure compliance with the law and can help dry up the "black" market in nickel. In answer to a member's question, the procedure to follow after a nickel theft was outlined.

The fourth speaker was **Harry Hirschman,** of the Dept. of Commerce who informally answered members' questions on "The Nickel Market." He discussed nickel sources and production throughout the world, the origin of premium nickel, allocation to various industries and the significance of withdrawals from stockpile.

The fifth speaker was **Dr. Samuel Heiman,** first vice-president of the AES, who spoke briefly on the aims and activities of the National Society.

EDWARD B. SAUBESTRE, Librarian

PHILADELPHIA

Fifty Members Hear Bertucio

The regular meeting on February 27 was preceded by dinner served to 33 in the dining room of the Engineers' Club; 50 attended the regular meeting. After the introduction of 5 guests by first vice-president **Farren,** the secretary read the minutes of the previous meeting. Branch president **Trusdell** spoke of the passing of honorary supreme society member **Albert Hirsch** and appointed a committee to investigate suitable means of perpetuating his memory. Two applications for membership were received and two members were admitted. The branch voted negative on the branch exhibits questionnaire sent out by third vice-president **Head** regarding the continuation of this feature at national conventions.

Trusdell

HENRY G. ORLIK
1909—1956

Henry G. Orlik, a member of the Philadelphia Branch, died of a heart attack on March 5. Born in Passaic, N. J. on October 1, 1909, Orlik was employed by the Radio Corporation of America as standards engineer in the Division of Standardizing at the time of his death.

He first joined the Philadelphia Branch in 1937 and held the posts of president and librarian. He is survived by his wife and son, of Oaklyn, N. J.

Nat Verrelle, chairman of the nominations committee, reported the nomination of the present officers and delegates for the 1956-57 term. **William H. Moyer** was nominated for the vacancy for a three-year term on the board of managers. A slate of alternate delegates would be presented at the March meeting. The secretary read announcements.

Brooks Ricca, librarian, introduced the speaker, **Edward C. Bertucio,** Mutual Chemical Division of Allied Chemical & Dye Corp., who spoke on "Interesting Applications of Chromium Plating." His talk, given with the aid of excellent slides, covered hard chromium plating and porous chromium applications: piston rings, printing plates, gun barrels, molds, cylinder linings, paper mill rolls. The material was very well presented.

The meeting adjourned at 9:30.

I. WM. MARCOVITCH, Secretary

PITTSBURGH

A New Slate; Dr. Wick Speaks

The Pittsburgh branch held their February meeting at the Avalon Room of the Sherwyn Hotel. The two free meals at the dinner preceding the meeting were won by **Bill Pizoli** and **Frank Mountain.**

At the short business meeting the nominating committee proposed the following slate for next year: president, **M. Ceresa;** 1st vice-president, **Herb Schram;** 2nd vice-president, **Jim Crain;** treasurer, **Bill Pizoli;** Secretary, **F. Stevens;** Librarian, **Russ Reynolds** and to the board of managers **Rudy Schindler,** delegates **Ed Smith, Bob Woofter** and **Leo Schmitt** and as alternate delegates **Myron Ceresa, R. Schindler** and **Rex Goldbach. Ken Hittle** reported that Baron Elliott's orchestra had been selected for ladies' night, April 21 at Gateway Plaza.

The branch was sorry to learn of three key members, **Ed Washburn, Art Kaupe** and **Fred Dixon,** branch officers past or present who are leaving due to job transfers or new positions.

Speaker for the evening was **Dr. Richard M. Wick** of Bethlehem Steel Company who discussed a subject on which he is an outstanding authority: "Continuous Electroplating of Strip and Wire."

During the break for refreshments the speaker drew the slip for the door prize winner. **Ed Sokalski** won a handy Casco steam iron presented by **Collin F. Stevens** of Frederic B. Stevens, Inc.

HERB SCHRAM, Secretary

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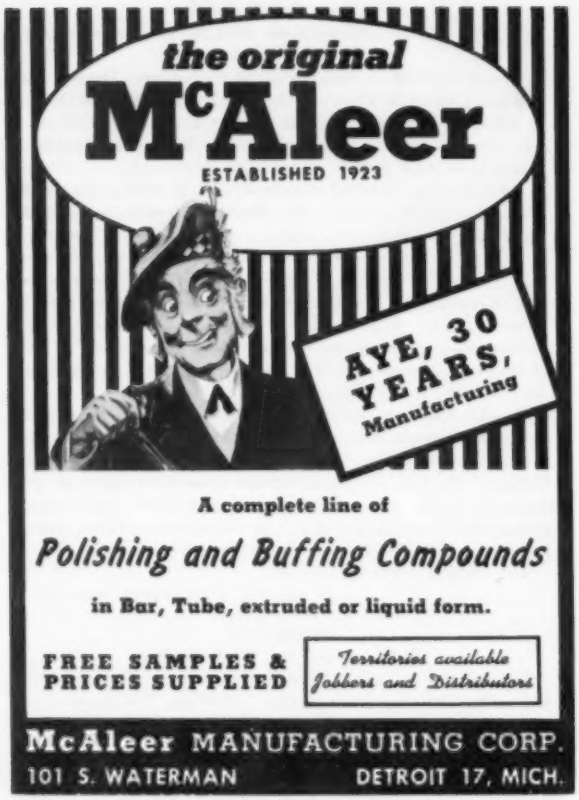

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BRANCH NEWS

PORTLAND

New Officers in the Beaver State

Our regular meeting was held January 16 at Berg's Chalet. We are pleased to report that we had a very fine turnout. The probable reason for this turnout was the election of officers for the Portland branch. The new officers are as follows: president, **Darrell Anderson;** 1st vice-president, **Oral Shepardson;** 2nd vice-president, **Ted Imhoff;** secretary-treasurer, **Dale Tweed.**

Dale Tweed was voted into the organization previous to the election of officers.

Also on the agenda for the evening was a film entitled "Quality Selling," which is put out by the Pacific Telephone & Telegraph Company. This film is very enjoyable and we would strongly recommend anyone who has the opportunity to take advantage of the telephone company's generosity in loaning out this film.

DALE TWEED, Secretary-Treasurer

ROCHESTER

A Plant Tour from a Cafeteria

The Rochester branch of the American Electroplaters' Society met on Monday, February 20 at 8:30 P.M. in the cafeteria of the Delco Appliance Division of General Motors Corp., plant "B" in Rochester, N. Y. The meeting was called to order by president **Ed Wallin** and turned over to **James Devlin** of Delco, who led a plant tour which proved to be a very interesting one. Upon our return to the cafeteria, a short business meeting was held. President Ed Wallin thanked the staff of Delco Appliance Division for the privilege and time granted to the branch for the tour. A reminder of the Buffalo regional meeting, April 14, 1956 was made and plans for attending were discussed.

FRED JOHNSON, Secretary

ROCKFORD

All Is Ready for April 14

The Rockford branch held their February 13 meeting at the Faust Hotel. It was preceded by a dinner in the Winnebago Room.

The meeting was called to order by **W. Foley,** who first asked each person present to stand and introduce himself. Guests included **Ed Stack** of Chicago, **Willard Carter** of the same city, **Roger Johnson** of Dearborn, Michigan, and many others. At the business meeting, **Lawrence Ray** reported all speakers for the annual educational session had sent him confirming letters, and that all was in readiness for the April 14 affair.

The speakers for the evening were **Walter Fox** of National Lock Co., **Bob Twyning** of Twyning Chemical Specialties, and **Bill Seiter** of Nelson and Storm. Their topic of discussion was polishing and buffing. Conducted in a question and answer manner, this proved to be a most delightful evening. It seemed, from the amount of questions asked and answers given, that all problems in the Rockford area should be pretty well taken care of

Meeting adjourned 9:30 P.M.

E. J. BUDDEN, Secretary-Treasurer

THE ROCKFORD BRANCH
AMERICAN ELECTROPLATERS' SOCIETY
ANNUAL EDUCATIONAL SESSION AND BANQUET
FAUST HOTEL SATURDAY APRIL 14, 1956

PROGRAM

TECHNICAL SESSION —1:30 P.M.— WILL FEATURE

1. "Buffing Compound"—**Paul Walker,** J. W. Miller Division, Hanson-Van Winkle-Munning Co. 2. "Bright Aluminum Anodizing"—**George E. Best,** Mutual Chemical Division, Allied Chemical & Dye Corp. 3. "Alkaline Derusting"—**Lloyd Gilbert,** Rock Island Arsenal.

BRANCH NEWS

The dinner dance will be held in the Grand Ballroom of the Hotel Faust, starting promptly at 6:30 P.M.

For tickets and reservations, call or write Rockford branch secretary.

E. J. Budden
122 12th St.
Rockford, Ill. Tel. 3-8395

SAGINAW VALLEY

Annual Attended by 375

The Saginaw Valley branch held their 7th annual ladies night at Zehnders Hotel in Frankenmuth, Mich., on February 4.

The annual party was attended by 375 members, guests and ladies. A door prize was presented to all the ladies, consisting of a pepper mill and salt shaker.

Durward Snyder of Buick Motor Division of Flint, was party chairman.

AL KNIGHT, Recording Secretary

ST. JOSEPH VALLEY

Dr. Carr's Presentation is Ably Reported

Fifty members and guests attended the February 1 meeting at the L. H. Inn. The nominating committee appointed by **Ralph Brouwer** was: **Dr. E. Wilhelm, T. D. Shafer** and **Wm. McDowell. Marshall Becknell** was elected to membership and applications from **George E. Shuman, A. P. Strickler** and **J. F. Devendorf** were read and accepted.

Carr

Art Wiegand gave a report on the ladies' night program. He asked suppliers for donations to cover prizes. **John Lockerbie** then expressed the opinion that the branch members should be able to finance this undertaking. He asked for contributions from the members. Thirty-seven dollars was collected.

Ray Dearth introduced **Dr. Dodd Carr** of Bart Laboratories who discussed "Nickel Electroforming." He pointed out that the problems of contaminated solutions are magnified in electroforming operations since the deposits may be 0.01 inch to 0.10 inch thick. Electroforming requires molds for starting. Molds must be: a. Water resistant b. Readily separable.

For best electroforming the radii of the mold should be as generous as permissible. The finish of the part should be specified. The smoother the original surface the easier it is separated. Various types of mandrels are available:—1. Aluminum molds are used, but are attacked by chloride solutions. 2. Alloy steels such as 12 per cent chromium may be hardened. 3. Bronze molds have high coefficiency of expansion. The plated parts may be shrunk to effect separation. 4. Glass molds are employed for reflectors. 5. Expendable molds are employed where it is impossible to separate the electroformed section otherwise.

Plastics, mixes or plaster of paris are also employed for use as mandrels.

Thorough cleaning of molds or mandrels is required, followed by passivation if permanent molds are employed. Common procedure is to flash nickel, followed by a thin copper. The parts may then be removed for examination. The parts can then be returned to a nickel bath for heavy nickel build-up.

Types of nickel baths employed:

The Watts' bath may be modified and tailored to give the desired physical properties. Deposits from the all-nickel chloride bath have very high internal stress. (40,000).

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Copper-Rolled Oval 1½" x 3"	

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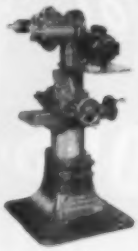

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BRANCH NEWS

Where complicated shapes are to be electroformed, insulating shields and conforming anodes (bagged) may be employed to obtain uniformity of deposit. Stresses of the deposit may cause splitting of the mold. Continuous purification is suggested to maintain low impurities. Stress measurements of the deposits by use of spiral contractometer are helpful.

Applications: 1. Phonograph record stampers. 2. Wave guides. 3. Slush molds. 4. Musical instruments. 5. Reflectors.

Finishing after electroforming may be done by grinding, polishing or machining.

A disadvantage of electroforming is the high cost of preparation. However, for close tolerances, this may be the only method.

Numerous questions were asked of Dr. Carr.

The meeting was adjourned at 9:20 P.M.

H. J. Wiesner, Secretary-Treasurer

ST. LOUIS

Lyons on Cleaning on a Cold and Rainy Night

The regular monthly meeting of the St. Louis branch was held at the York Hotel on February 8. The business session was called to order by president **Hunleth** with 25 members and guests present. The attendance was impaired by a cold rain making it very blustery. Consequently the business meeting was held as short as possible and the meeting was turned over to our librarian **Dick Nyquist** who proudly introduced a member of our own branch **Dr. Ernest Lyons** who talked on the "Chemical Aspects of Cleaning." Dr. Lyons gained practical experience through his work in the past with the Meaker Company in Chicago. He is presently conducting research work in this field at Principia College in Elsah, Ill.

Dr. Lyons illustrated his talk by blackboard diagrams and formulas. His talk covered the oxide bonds and emulsification as well as explaining the necessity of the various ingredients compounded in cleaners.

He concluded his talk by relating some humorous experiences pertaining to hydrogen explosions in cleaner foam blankets.

The members grieved at the passing of **Francis Fecherty** one of our staunch members who had served as a member of our board of governors. He will be sadly missed by all who knew him.

Ward W. Kelly, Secretary-Treasurer

SPRINGFIELD

House Talks on Insides of Plating Barrels

The Springfield branch met at Blake's restaurant for their February meeting. There were 31 members and guests present.

After enjoying a good dinner, and a short business meeting, the balance of the evening was given over to **Norman K. House,** our guest speaker. House is vice-president of Lasalco, Inc. of St. Louis, and had for his subject: "What Happens in a Plating Barrel." With his talk, House had a self-explanatory film, in color, of the inside of various types of plating barrels while they were under load, and in operation. With this bird's-eye view, we received a pretty good idea of what was going on inside all the time the load was in operation and with different shaped pieces of work. A question period followed.

Springfield wishes to thank House for an informative and interesting evening.

Henry L. Heissfeld, Secretary

SOUTHEASTERN

First Annual a Smasheroo

Overcast skies failed to discourage the more than 200 members and friends who attended the first annual meeting of Southeastern branch at the Biltmore Hotel in Atlanta on February 10 and 11. A milestone in the history of the Southeastern branch, the two-day program was "highly successful," thanks to the efforts of an energetic committee headed by **Richard R. Russell** of Udylite Corporation, the general chairman.

The affair was opened on Friday morning by branch president

Clyde Stovall of Scripto Co. with the Reverend **Jack Ballard** of Mt. Carmel Christian Church of Decatur, Georgia, giving the invocation. Close to 100 heard talks by **William E. Ennis,** technical director of MacDermid, Inc., on "Preparation of Metals for Finishing" and **Clarence H. Sample,** head of the electroplating section of International Nickel Company on "Corrosion Behavior and Protective Value of Electrodeposited Metals." National executive secretary **Peter Kovatis** spoke on the advantages of AES membership and the society research program. In the afternoon, the following addressed the branch: **Edward C. Bertucio,** technical service engineer, Mutual Chemical Company whose topic was "Interesting Applications of Chromium Plating;" and **Howard A. McAleer,** president, Formax Manufacturing Corporation who spoke on "Buffing and Polishing of Metals." National 3rd vice-president **Herberth E. Head** of Chrysler Corporation spoke briefly about branch exhibits and national past presidents **Cleve Nixon** of General Motors Corporation and **Fred Fulforth** of United Chromium Corporation were introduced.

Committees and Speakers, Southeastern Branch Annual Meeting

Plating Staff Photos

Back row: L. Rosenburg, D. Carr, H. Stogner, E. Bertucio, C. Nixon; **front row:** G. Taylor, R. Russell, R. Probert, C. Lewis

C. Sample, W. Innis, C. Stovall, D. Griffin, H. McAleer

Mrs. R. Taylor, Mrs. C. Stovall, Mrs. G. Taylor

Friday was also the day of the ladies program. A large contingent of the fair sex was on hand to take in a planned Atlanta sight-seeing tour which was followed by a luncheon, both sponsored by the Production Plating Company of Adel, Georgia.

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Chromium	4.000	63.0
Copper	6.000	2.5
Germanium	4.000	—
Gold	2.000	6.2
Indium	4.000	2.5
Iron	3.000	10.2
Lead	5.000	3.8
Nickel	5.000	5.1
Nickel (Black)	5.000	—
Platinum	3.000	17.5
Rhodium	3.000	70.0
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Tin	5.000	2.5
Zinc	3.000	3.8

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BRANCH NEWS

On Saturday, the morning program featured Cleve F. Nixon, head of the electrochemistry department, General Motors Corporation, who presented "Increase of Corrosion Resistance of Outside Automobile Parts" and **Dr. Dodd S. Carr,** director of electrochemical research, Bart Manufacturing Company who spoke on "Nickel Plating Inside Pipes and Fittings."

Educational sessions were moderated by **Dave Griffin** of the Birmingham Plating Works.

A dinner-dance attended by over 200 climaxed the annual meeting and featured outstanding talent from Atlanta's most popular nightclubs.

Assisting chairman Russell were the following hard-working committeemen: educational, **Charles I. Lewis,** Simmons Plating Works; publicity, **George W. Taylor,** Production Plating Co.; entertainment, **Louis Rosenburg,** Simmons Plating Works; program, **H. T. Stogner, Sr.,** Atlanta Plating Works; registration, **Clem H. Hohner,** Udylite Corporation; and secretary-treasurer, **Robert H. Probert,** Atlanta Plating Works.

The ladies program committee included **Mrs. Clyde Stovall,** chairman; **Mrs. George Taylor** and **Mrs. Robert Taylor.**

W. T. Weymouth, Secretary

WATERBURY

Eddy on Membership; Murray on Stripping

The February meeting of the Waterbury branch was held on February 9 in the Colonial Room of the Hotel Elton. The business meeting was called to order by president **J. Petrocelli** at 7:20 P.M. Secretary **A. Griffith** reported on the annual Tri-State Regional being held in Dayton, Ohio on March 10 and the ASTM Symposium on electrodeposited metallic coatings being held in Buffalo, N. Y. February 29.

Petrocelli

E. Garland reported on the overall program of the Northeastern Regional to be held in Hartford, Conn., April 7 and indications point to a well-balanced program for the ladies as well as the men. Second vice-president **S. Henn** reported for **Dick Crane** on the progress of the Northeastern Regional advertising committee, and it appears the committee will attain its financial goal.

A general discussion on membership and attendance was initiated by secretary A. Griffith with many suggestions from the floor for improving attendance. **F. Eddy,** 2nd vice-president of the national society, talked briefly on means of initiating a membership drive but pointed out that securing new members was every member's job.

Eddy

Librarian E. Garland outlined tentative plans for a tour of Lea Mfg. Co. in lieu of an April meeting.

There being no further business the meeting was adjourned at 8:00 P.M.

President J. Petrocelli turned the meeting over to technical chairman **I. Cross** who then introduced **W. K. Murray** of Enthone Inc. who spoke on "Stripping of Electroproducts." Murray gave an excellent discussion on the mechanism of stripping, and various strippers produced by Enthone that were rapid and did not attack the base metal. A question and answer period followed.

WESTERN ONTARIO

Brackett on Temperature

In January the Western Ontario branch held a ladies' night at the Wm. Pitt Hotel, Chatham in place of a regular meeting. A big crowd of local platers and friends enjoyed the dinner and dancing.

A regular dinner and educational session was held February 17 at the Wm. Pitt Hotel, Chatham. Several matters of importance including branch history were discussed. Delegates for the annual convention are to be selected at the March meeting. Nominating committee of past presidents **(Norm Southern, Ed Turner** and **Les Crooks)** are to bring in suggested slate of officers for the 1956–57 year.

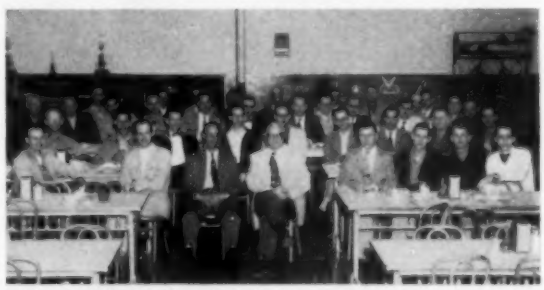
Our speaker was **John Brackett** of the H. O. Trerice Co. of Detroit whose subject was "Temperature." In the first part of his talk he gave us a romance of temperatures from the invention of the earliest gas thermometer by **Galileo** in Florence to the modern self-regulating, self-recording controls. He told us the major technical advances in the past fifty years had been tied to temperature. His talk then turned to the importance of "one best temperature" for every process especially to cleaning and plating tanks. It was pointed out that temperature controls would pay for themselves by conserving fuel and water, save money by freeing man-power for other work and improve quality by keeping solutions constant in temperature. A short question period followed and the speaker was thanked by this writer.

Alex. V. Corbit, Vice-President

WICHITA

Cessna Plays Host

The Wichita branch had what is believed to be one of the largest turnouts in its history and it is quite understandable since the regular February meeting was a tour through the Cessna Aircraft plant.



How the Wichita branch looked at its February meeting. The Cessna Aircraft Co. presented each member with a copy of the above photo

To begin with and to equip each member with the necessary strength and fortification to make the trip through this tremendous plant, the chiefs of the Cessna Aircraft plant cafeteria outdid themselves by preparing a delicious assortment of foods doing justice to one of the governor's banquets. The tour started naturally in the plating shop which itself covers several thousand square feet and into the heat treating room which is adjacent to the plating room, and throughout the various parts of the plant step by step until the tour covered the entire finished airplane.

Next we were permitted to view the revolutionary new Cessna helicopter which we understand is designed on a new principle.

A room was furnished for the AES, courtesy of the Cessna Aircraft Company where we held our regular meeting. **Don Thresher,** public relations department of the Cessna Aircraft Company, answered all questions and gave us a resume of the tremendous growth the Cessna Aircraft Company has experienced in the past few years.

Members presented their nomination papers to the secretary for the tabulation and nomination of next year's group of officers.

Ogle French, president of Wichita branch AES, adjourned a meeting thoroughly enjoyed by everyone present.

F. B. Swift, Secretary

DIRECTORY OF OFFICERS AND RESEARCH CHAIRMAN

AES OFFICERS

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American Plating Company
808 Keo Way, Des Moines, Iowa

First Vice-President.....DR. SAMUEL HEIMAN
Philadelphia Rust Proof Company
3227 Frankford Avenue, Philadelphia 34, Pa.

Second Vice-President.....FRANCIS T. EDDY
Technicraft Laboratories, Inc.
Thomaston-Waterbury Road, Thomaston, Conn.

Third Vice-President.....HERBERTH E. HEAD
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Chrysler Corporation
Detroit 31, Mich.

Past President.....DR RALPH A. SCHAEFER
Clevite Brush Development Company
Division of Clevite Corporation
540 E. 105th Street, Cleveland 8, Ohio

Executive Secretary.....P. PETER KOVATIS
445 Broad Street, Newark 2, N. J.

AES RESEARCH COMMITTEE

Chairman.....LESLIE C. BORCHERT
Houdaille-Hershey Corp., Detroit, Mich.

Secretary.....P. PETER KOVATIS
445 Broad Street, Newark 2, N. J.

AES BRANCH DIRECTORY

ADELAIDE meets second Wednesday of each month at 7:30 P.M. at the University of Adelaide, North Terrace, Adelaide. Secretary-treasurer, R. J. Down, Room 30, 17 Currie Street, Adelaide, S. A., Australia.

ALLENTOWN-READING meets fourth Thursday of each month at 7:00 P.M. in Scotty's Anchorage, Second and Main Streets, Emmaus, Pa. Secretary-treasurer, Edgar H. Iobst, Jr., 163 Main Street, Emmaus, Pa. Research finance committee chairman, Lee C. Wotring, 526 N. St. Elmo Street, Allentown, Pa.

BALTIMORE-WASHINGTON meets second Tuesday of each month with meetings in Baltimore at the Marling House, 20 E. Fayette Street, and in Washington, D. C. at the Chemistry Lecture Room in the Chemistry Bldg. of the National Bureau of Standards, Connecticut Avenue and Van Ness Street. Secretary, Carl H. Thiede, 8426 Piney Branch Road, Silver Springs, Md.

BOSTON meets first Thursday of each month in Hotel Statler. Secretary, Dr. George P. Swift, 53 Galen Street, Watertown 72, Mass. Research finance committee chairman, Louis V. Gagnon, 53 High Street, Natick, Mass.

BRIDGEPORT meets second Friday of each month in Barnum Hotel. Secretary-treasurer, Robert G. Parker, 25 Beverly Road, Bridgeport 58, Conn.

BUFFALO meets first Friday of each month in Markeen Hotel. Secretary, E. G. Sampson, Jr., 43 W. Main Street, Falconer, N. Y. Treasurer, R. E. Campbell, 238 Sprague Street, Jamestown, N. Y. Research finance committee chairman to be appointed.

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AES BRANCH DIRECTORY

educational session at 8 P.M. Secretary, Charles Schenk, 1765 Lenox Road, Schenectady, N. Y. Treasurer, John Green, R. D. 1, Thatcher Park Road, Voorheesville, N. Y. Research finance committee chairman, Chester J. Klimek, 16 Southern Avenue, Pittsfield, Mass.

CENTRAL MICHIGAN meets second Tuesday of each month at 7:00 P.M., alternating between Meadow Lark Inn in Jackson and Porter Hotel in Lansing. Secretary-treasurer, E. J. Bosca, 411 Third Street, Jackson, Mich. Research finance committee chairman, Dr. F. Gurnham, Dept. of Chemical Engineering, Michigan State College, E. Lansing, Mich.

CHICAGO meets second Friday of each month at 8 P.M. at Western Society of Engineers, 84 E. Randolph Street. Secretary-treasurer, Paul Glab, 882 N. Paulina Street, Chicago 22, Ill. Research finance committee chairman, Charles Geldzahler, c/o Platers' Technical Service, Inc., 509 S. Wabash Avenue, Chicago 9, Ill.

CINCINNATI meets fourth Wednesday of each month at 6:30 P.M. in Engineering Society Headquarters, East McMillan Street and Woodburn Avenue. Secretary, R. K. Evans, 8484 Wicklow, Cincinnati 36, Ohio. Treasurer, G. T. Speers, 1203 Fifth Avenue, Dayton, Ky. Research finance committee chairman, W. Wilson Loveless, 1350 Arlington Street, Cincinnati 25, Ohio.

CLEVELAND meets first Friday of each month in Hotel Carter at 8 P.M. Secretary-treasurer, R. I. Peters, 12901 Elmwood Avenue, Cleveland, Ohio.

COLUMBUS meets first Friday of each month at 8 P.M. in Battelle Memorial Institute Auditorium. Secretary, Michael Farr, 1735 Franklin Avenue, Columbus 5, Ohio. Research finance committee chairman, to be appointed.

DALLAS-FORT WORTH meets third Wednesday of each month at 6:30 P.M. in Lennox Hotel, Grand Prairie, Texas, half-way between Fort Worth and Dallas. Secretary-treasurer, research finance committee chairman, A. C. Fricke, 212 Julien Street, Dallas 3, Texas.

DAYTON meets third Wednesday of each month in the Biltmore. Secretary, Richard M. Clinehens, 3206 Harwood Street, Dayton 10, Ohio. Research finance committee chairman to be appointed.

DETROIT meets first Friday of each month in Hotel Statler at 8 P.M. Secretary-treasurer, Edward J. Kubis, Wyandotte Chemicals Corp., Wyandotte, Mich. Research finance committee chairman, R. J. Racine, Wyandotte Chemicals Corp., Wyandotte, Mich.

GRAND RAPIDS meets second Friday of each month at Fingers Restaurant at 7 P.M. for dinner, educational session at 8:15 P.M. Secretary, Don Smith, 1825 Martin, Grand Rapids, Mich. Treasurer, P. Norton, 1119 Orchard. S. E., Grand Rapids, Mich. Research finance committee chairman, R. O. Watson, 3045 Kalamazoo, S. E., Grand Rapids, Mich.

HAMILTON meets third Friday of each month, 8 P.M. at Fishers Hotel, Hamilton, Ontario, Canada. Secretary, N. A. Graham, Stoney Creek, P. O. Hamilton, Ont., Canada. Research chairman, W. G. Finlay, 7 Hill Street, Hamilton, Ont., Canada.

HARTFORD meets third Monday of each month in Hotel Bond, Hartford, Conn., at 7:45 P.M. Secretary, Stanley Platoz, 26 Erwin Place, New Britain, Conn. Treasurer, B. Cohen, 185 High Street, Willimantic, Conn. Research finance committee chairman, Frank Smith, Derby Milford Road, R. F. D. I, Orange, Conn.

HOUSTON meets third Tuesday of each month at 7 P.M. in the Ben Milam Hotel, Houston, Texas. Secretary-treasurer, H. C. Van Wagner, c/o Barada & Page, 2812 Center Street, Houston, Texas. Research finance committee chairman, O. L. Smith, 2903 W. Dallas, Houston, Texas.

INDIANAPOLIS meets first Wednesday of each month at 8 P.M. at Fox Steak House, 1207 E. Washington Street. Secretary, Miss Edna Rohrabaugh, 1300 Burroughs Street. Lafayette, Ind.

JACKSON-LANSING: Name has been changed. See Central Michigan.

KANSAS CITY meets third Thursday of each month at the Berkshire Hotel, Troost and Linwood Blvd., Kansas City, Mo. Secretary, Olin K. Bock, Turco Products, Inc., 2112 Grand Ave., Kansas City, Mo.

LANCASTER meets second Friday of each month at 8 P.M. September, December and April meetings are held at Hanover, York and Harrisburg, respectively; all other meetings at the Old Mill Inn, Lancaster, Pa. Secretary-treasurer, Harry A. Saylor, 40 N. Poplar Street, Elizabethtown, Pa. Research finance committee chairman, Harry Hovis, Lincoln Highway, W. Lancaster, Pa.

LOS ANGELES meets second Wednesday of each month at 7 P.M. in Rodger Young Auditorium. Secretary, G. Hetz, 152 Clagstand Drive, Puente, Calif. Research finance committee chairman, Tony Stabile, 417 E. 16th Street, Los Angeles 21, Calif.

LOUSIVILLE meets third Thursday of each month at 6:30 P.M., in Kapfhammers Party House, 1506 S. Shelby Street, Louisville, Ky. Secretary-treasurer, Joseph G. Sterling, 6025 Peggy Drive, Louisville 13, Ky. Research finance committee chairman, R. G. Marshall, 3020 Talisman Road. Louisville 5, Ky.

MELBOURNE meets third Thursday of each month at 8 P.M in Metallurgy Theatre, Melbourne Technical College, 124 Latrobe Street. Honorary secretary-treasurer, B. Reaburn, Park Road, Ringwood, Victoria, Australia.

MILWAUKEE meets first Friday of each month at 8 P.M. in the East Room, Hotel Ambassador. Secretary-treasurer, Clifford A. Peters, 4124 W. Southland Drive, Milwaukee, Wisc. Research finance committee chairman, Les Diveley, 2936 N. 84th Street, Milwaukee 11, Wisc.

MISSISSIPPI VALLEY meeting date to be announced. Secretary-treasurer, P. G. Chamberlain, 2131 Harrison St., Davenport, Iowa.

MONTREAL meets first Tuesday of each month at 8:30 P.M. in Mount Royal Hotel. Secretary, Jean Monette, 11700 Notre Dame Street, E., Montreal, Canada. Research finance committee chairman, P. M. Coady, 216 Westminster Avenue, Montreal West, Montreal, Canada.

NEWARK meets third Friday of each month at 8 P.M. in Hotel Robert Treat. Secretary, Dr. D. G. Foulke, Hanson-Van Winkle-Munning Co., Matawan, N. J. Treasurer, George Wagner, Hy-Grade Electro Plating Co., 35 Fourth Street, Newark, N. J. Research finance committee chairman, John Gumm, 538 Forest St., Kearny, N. J.

AES BRANCH DIRECTORY

NEW HAVEN meets second Tuesday of each month at Mason Laboratory, Yale University. Secretary-treasurer, B. J. Gaffney, 40 Filbert Street, Hamden 14, Conn. Research finance committee chairman, W. K. Murray, 48 Maple Avenue, Meriden, Conn.

NEW YORK meets second and fourth Fridays of each month at 8:30 P.M. in the Statler Hotel. Secretary-treasurer and research finance committee chairman, Milton Nadel, 41–15 50th Avenue, Long Island, N. Y.

PHILADELPHIA meets fourth Monday of each month at the Engineers' Club, 1317 Spruce Street, Philadelphia, Pa., at 8 P.M. Secretary, I. Wm. Marcovitch, 1302 St. Vincent Street, Philadelphia, Pa. Research finance committee chairman, Herman P. Wright, 194 Atlantic Avenue, Trenton, N. J.

PITTSBURGH meets first Wednesday of each month at 8 P.M. in the Avalon Room of the Sheraton Hotel. Secretary, Irvin H. Schram, Jr., 4782 Delma Drive, Pittsburgh 27, Pa. Treasurer, W. F. Pizoli, 6833 Meade Street, Pittsburgh 8, Pa. Research finance committee chairman, Myron Ceresa, 207 Highland Road, Pittsburgh 35, Pa.

PORTLAND meets second Tuesday at 6:30 P.M. in Berg's Chalet. Secretary-treasurer, Dale Tweed, 3950 N. W. Yeon Avenue, Portland, Ore.

PROVIDENCE-ATTLEBORO meets third Monday of each month at 8 P.M. in Providence Engineering Society Hall, 195 Angell St., Providence, R. I. Secretary, F. L. Sherman, 17 Hillsdale Drive, Cranston, R. I. Research finance committee chairman, P. B. Lonsbury, 78 North Ave., Attleboro, Mass.

ROCHESTER meets third Monday of each month at 8 P.M. at the 40 & 8 Club, 933 University Avenue. Secretary, Frederick Johnson, 21 Shire Oaks Drive, Pittsford, N. Y. Research finance committee chairman, Clarence Van Epps, 305 Hurstburne Road, Rochester 9, N. Y.

ROCKFORD meets second Monday of each month at 7 P.M. in the Faust Hotel. Secretary-treasurer, E. J. Budden, 122 Twelfth Street, Rockford, Ill. Research finance committee chairman, David Stockton, 1511 Warren Road, Rockford, Ill.

SAGINAW VALLEY meets at Zehnder, Frankenmuth, Mich., second Wednesday of each month, September through May, except February, at 7 P.M. Secretary-treasurer, Raymond E. Gittins, 215 N. Birney, Bay City, Mich.

ST. JOSEPH VALLEY meets first Wednesday of each month at 8 P.M. in Hotel Elkhart, Elkhart, Ind. Secretary-treasurer, Harold J. Wiesner, 1016 Osolo Road, Elkhart, Ind. Research finance committee chairman, Arthur G. Wiegand, 181 North Elkhart Avenue, Elkhart, Ind.

ST. LOUIS meets second Wednesday of each month at 6:30 P.M. at the York Hotel, 6th and Market, St. Louis. Secretary-treasurer, Ward W. Kelly, 7046 Deerpath Drive, St. Louis, Mo. Research finance committee chairman, Robert Coulson, 2300 Locust Street, St. Louis 3, Mo.

SAN ANTONIO meets third Monday of each month at DeWinne's Belgium Inn, 3119 W. Commerce, San Antonio, Texas at 7 P.M. Secretary-treasurer, T. H. Collard, 442 Pilgrim Drive, San Antonio, Texas.

SAN FRANCISCO meets second Thursday of each month alternating between St. Julien Restaurant, 140 Battery Street, San Francisco, and El Curtola Restaurant, 510 17th Street, Oakland. Secretary, B. I. Trygstad, 1727 Oak Street, Redwood City, Calif. Treasurer, R. L. Hefner, 286 Martens Avenue, Mt. View, Calif.

SEATTLE-PUGET SOUND meets the third Tuesday of each month at 8 P.M. at the Stewart Hotel, Second and Stewart, Seattle, Wash. Secretary, Mrs. Helen Archibald, 17560 Tenth Avenue, N. W., Seattle, Wash. Treasurer, R. Becker, 558 First Avenue, So., Seattle, Wash.

SOUTHEASTERN meets second Friday of each month at 7:30 P.M. at the Belmont Steak House, Atlanta, Ga. Secretary-treasurer, W. T. Weymouth, P. O. Box 246, Weaverville, N. C. Research finance committee chairman, C. H. Hohner, Udylite Corp., 1841 Cheshire-Bridge Road, N. E., Atlanta, Ga.

SOUTHERN TIER meets third Tuesday at 7:30 P.M. at the Ah-Wa-Ga Hotel, Owego, N Y. Secretary, R. W. Wheeler, Austin F. Fletcher, Inc., Box 536, Binghamton, N. Y. Treasurer, M. Ihrie, 14 Pine View Terrace, Sydney, N. Y. Research finance committee chairman, E. Szymaniak, 118 Downs Ave., Johnson City, N. Y.

SPRINGFIELD meets fourth Monday of each month at 6:30 P.M. in Blakes Restaurant, 15 Market Street, Springfield, Mass. Secretary, Henry L. Heissfeld, 74 Chilson Street, Springfield, Mass. Treasurer, G. H. Mangeau, Hampton Ponds, Westfield, Mass. Research finance committee chairman, John E. Costigan, 74 Clairmont Place, Longmeadow, Mass.

SYDNEY meets second Thursday of each month at the Trust Bldg. CNR, Martin Place & Castlereigh Street, Sydney. Secretary-treasurer, J. E. W. L. Smith, 38 St. Ann Street, Merrylands, N. S. W. Australia.

SYRACUSE meets third Monday of each month at 8 P.M. in Richard's Restaurant, 106 Ashdale Avenue, Syracuse, N. Y. Secretary, A. G. Martineau, Jr., 1024 Onondaga Avenue, Syracuse, N. Y. Treasurer, Allen A. Gutekunst, 224 Rich Street, Syracuse, N. Y. Research finance committee chairman, K. S. Parnell, 126 Wood Avenue, Syracuse, N. Y.

TOLEDO meets first Thursday of each month at Park Lane Hotel. Dinner at 6:30 P.M.; meeting at 8 P.M. Secretary-treasurer, Gaston Bergeman, 703 Pine Street, Fremont, Ohio.

TORONTO meets second Friday of each month in Royal York Hotel. Dinner, 6:30 P.M.; meeting, 8:30 P.M. Secretary-treasurer, E. F. Hutt, 19 Aneta Circle, Willowdale, Ontario, Canada.

TWIN CITY meets first Monday of each month. October through June, in the Covered Wagon (Lodge Room), 114 S. 4th Street, Minneapolis, Minn., at 7 P.M. Secretary-treasurer, Robert L. Buckley, c/o Industrial Chemical and Equipment Co., 205 11th Avenue, So., Minneapolis 15, Minn. Research finance committee chairman, E. H. Lindemann, 1213 N. Leighton, Minneapolis 22, Minn.

WATERBURY meets second Thursday in September through May. Dinner 6 P.M.; business meeting 7 P.M.; technical meeting 8 P.M. Secretary-treasurer, Albert G. Griffith, 94 Ridgeview Place, Cheshire, Conn. Research finance committee chairman, Francis X. Bergen, 25 Steuben Street, Waterbury, Conn.

WESTERN ONTARIO meets third Friday of each month at the Bungalo Inn, Lambeth, Ontario at 9 P.M. Secretary-treasurer, Dave Mainland, 21 Maple Street, Chatham, Ontario. Research finance committee chairman, Paul B. Croly, c/o Ontario Steel Products, Ltd., Chatham, Ontario.

WICHITA meeting place indefinite. Secretary, Frank Swift, 2041 North Mosley, Wichita 4, Kan. Treasurer, Leon Lawless, 1211 E. Douglas, Wichita, Kan.

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FUTURE MEETINGS

AES

April 7—New England Regional Meeting, AES, Hotel Statler, Hartford, Conn.

April 14—Second Annual Empire State Regional Meeting, AES, Hotel Statler, Buffalo, N. Y.

April 14—Annual Educational Session and Banquet, Rockford Branch, AES, Faust Hotel.

April 20—Editorial Board meeting, 10 A.M., National Headquarters.

April 28—Milwaukee Branch, AES, Annual Meeting, Schroeder Hotel, Milwaukee, Wis.

May 5—Annual Regional Meeting, Toronto Branch AES, Sheraton-Brock Hotel, Niagara Falls Ontario, Canada.

May 5—20th Annual Banquet and Technical Session, Boston Branch, Hotel Statler, Boston, Mass.

June 17-21—43rd Annual Convention of the AES, Hotel Statler, Washington, D. C.

June 17-20, 1957—44th Annual Convention of the AES, Sheridan-Mt. Royal Hotel, Montreal, Canada.

May 19-22, 1958—45th Annual Convention of the AES, Sheraton-Gibson Hotel, Cincinnati, Ohio.

INTERSOCIETY

April 8-13—American Chemical Society, Spring Meeting, Dallas, Texas.

April 9-12—Society of Automotive Engineers, Aeronautic Meeting, New York.

April 10-11—American Society of Mechanical Engineers, Conference, Worcester, Mass.

April 10-12—Metal Power Association, Annual Meeting and Metal Power Show, Hotel Cleveland, Cleveland, Ohio.

April 12-13—Malleable Founders' Society, 7th Market Development Conference, Edgewater Beach Hotel, Chicago, Ill.

April 16-17—American Society of Mechanical Engineers, Conference, Washington, D. C.

April 22-26—American Ceramic Society, New York, N. Y.

April 23-25—Electron Physics International Conference, College Park, Md.

April 26-27—American Institute of Electrical Engineers, National Meeting, Bradford Hotel, Boston, Mass.

April 29-May 1—The Electrochemical Society, Mark Hopkins Hotel, San Francisco, Calif.

May 3-9—American Foundrymen's Society, Annual Convention, Atlantic City, N. J.

May 4—3rd Annual Conference for Engineers, Ohio State University, Ohio.

May 7-11—American Welders Society, Spring Meeting, Hotel Statler, Buffalo, N. Y.

May 8-11—ASME Metals Engineering, AWS Conference, Hotel Statler, Buffalo, N. Y.

May 9-10—National Association of Corrosion Engineers, Symposium, University of Buffalo, Buffalo, N. Y.

May 14-17—ASME Design Engineering Conference, Convention Hall, Philadelphia, Pa.

May 15-17—11th Purdue Industrial Waste Conference, Purdue Memorial Union, Lafayette, Indiana.

May 23-26—ASME-EIC Meeting, Mount Royal Hotel, Montreal, Quebec, Canada.

June 3-8—SAE Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 11-15—7th National Plastics Exposition, Society of The Plastics Industry, N. Y.

June 18-22—59th Annual Meeting ASTM, Chalfonte-Haddon Hall, Atlantic City, N. J.

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Only "Help Wanted" and "Situations Wanted" will be accepted. Rates: $.20 per word, minimum $5.00. AES branch members and members-at-large only, in good standing, are entitled to a total of three *free* advertisements in any twelve month period as of first insertion. Last day for inserting advertisements is the 10th of month preceding date of publication. When answering advertisements please address as follows: Box number, PLATING, 445 Broad Street, Newark 2, N. J.

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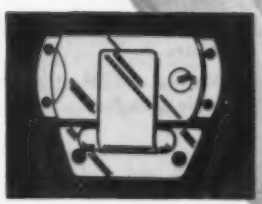

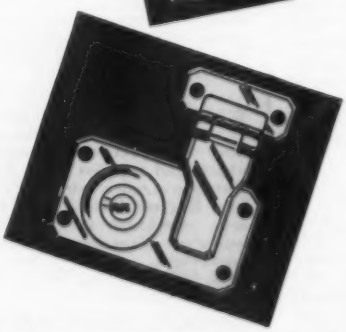

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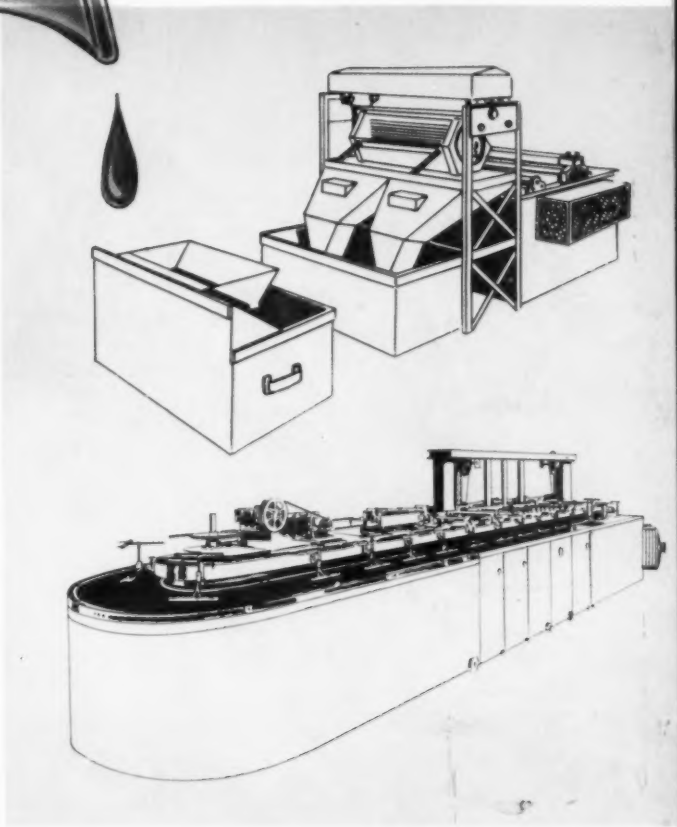

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